
Cathcart Landfill Environmental Monitoring Report

Second
Semiannual and
Annual Summary

2019



Table of Contents

Table of Contents	2
Tables	2
Figures	2
Appendices	3
1.0 INTRODUCTION	4
1.1 BACKGROUND.....	4
1.2 MONITORING PROGRAM.....	4
2.0 GROUNDWATER MONITORING	6
2.2 FIRST SEMIANNUAL GROUNDWATER SAMPLING.....	6
2.3 EVALUATION OF GROUNDWATER ANALYTICAL RESULTS.....	7
2.4 STATISTICAL EVALUATION.....	11
3.0 SURFACE WATER MONITORING	18
3.1 SURFACE WATER SAMPLING.....	18
4.0 LANDFILL GAS MONITORING	19
5.0 SUMMARY AND RECOMMENDATIONS	22
5.1 SUMMARY.....	22
5.2 CONCLUSIONS/RECOMMENDATIONS.....	23
5.3 SIGNATURES AND LICENSES.....	24

Tables

Table 1 – First Semiannual 2019 Groundwater Measurements.....	6
Table 2 – Summary of Annual 2019 Shallow Well Standard Exceedances.....	7
Table 3 – Summary of Annual 2019 Deep Well Standard Exceedances.....	9
Table 4 – Summary of Annual 2019 Shallow Well Prediction Limit Exceedances.....	12
Table 5 – Significant Trends, Shallow Wells 2019.....	14
Table 6 – Summary of Annual 2019 Deep Well Prediction Limit Exceedances.....	15
Table 7 – Significant Trends, Deep Wells 2019.....	17
Table 8 – Second Semiannual 2019 Surface Water Analytical Results.....	19
Table 9 – Cathcart Landfill Leachate Flow Totals, 2019.....	20
Table 10 – Leachate Vault Results – Inorganics.....	22
Table 11 – Leachate Vault Results – Inorganics.....	22
Table 12 – Leachate Vault Results – VOCs.....	22
Table 13 – Leachate Vault Results – PAHs.....	22

Figures

Figure 1 – Vicinity Map
Figure 2 – Site Map
Figure 3 – Site Topography Map
Figure 4 – Geologic Map
Figure 5 – Monitoring Network Map
Figure 6a – Shallow Aquifer Groundwater Elevation Contours – Second Quarter 2019
Figure 6b – Deep Aquifer Groundwater Elevation Contours – Second Quarter 2019
Figure 6c – Shallow Aquifer Groundwater Elevation Contours – Fourth Quarter 2019
Figure 6d – Deep Aquifer Groundwater Elevation Contours – Fourth Quarter 2019
Figure 7 – Leachate Pretreatment System Flow Diagram

Appendices

Appendix A – Hydrographs

Appendix B – Groundwater Analytical Summary Tables

Appendix C – Groundwater Statistical Analyses

Appendix D – Field Monitoring Forms

1.0 INTRODUCTION

The following report presents the results of groundwater, surface water, landfill gas, and associated infrastructure monitoring for the second semiannual monitoring period (*July through December*) of 2019 and the annual 2019 summary environmental monitoring report for the Cathcart Sanitary Landfill (*Landfill, site*). The site is located at 8915 Cathcart Way, just west of the intersection of Cathcart Way and State Route 9 in south-central Snohomish County, Washington. The location of the site relative to existing municipal improvements is shown on the **Vicinity Map (Figure 1)**.

1.1 BACKGROUND

The Cathcart Landfill was designed and permitted in the late 1970s and was operated as a solid waste landfill for 12 years, and ceased accepting any new solid waste in June 1992.

The closed landfill is approximately 60 acres in area and is part of a larger County parcel. The Cathcart Landfill is bounded by private residential property to the northwest, north and east and by other Snohomish County facilities to the south and west. Existing site improvements and the site layout are shown on the **Site Map (Figure 2)**, and existing site topography is shown on the **Site Topographic Map (Figure 3)**. Surficial geology of the site area is shown on the **Geologic Map (Figure 4)**.

Leachate is collected and gravity flows to a pretreatment facility, after which it is pumped to the **City of Everett's** Wastewater Treatment Plant for final treatment and discharge. Gas generated by the landfill is collected and extracted through a negatively pressurized system and discharged through an on-site gas flaring facility.

The Landfill is currently permitted for post-closure monitoring by the Snohomish Health District (SHD) with a Solid Waste Facility Permit (SW-011, SHD 2019). Monitoring results are reviewed by both the SHD and the Department of Ecology.

1.2 MONITORING PROGRAM

The site is currently monitored following the procedures outlined in the approved **Sampling and Analysis Plan (SAP; Landau Associates, Inc. dated 2006)**. In addition, the County submitted an Application of Variance to the SHD in 2018 to modify the monitoring programs at the site; the changes were conditionally approved by SHD with input from Ecology in their letter dated December 6, 2018. The changes to the monitoring program, which were approved pending the completion of a revised SAP, will be incorporated into the new SAP and are summarized as follows:

- **Groundwater Monitoring:** Sample frequency at all wells (except for G-09S, G-09D, G-10S, and G-10D) reduced from quarterly to semiannual; reporting for all wells will be completed on a semiannual basis. Chemical analytical suites will remain unchanged from those specified in the 2006 SAP.
 - Wells G-09S, G-09D, G-10S, and G-10D will continue to be sampled quarterly and will be reported in the semiannual monitoring reports. Due to a gap in the data

for wells G-09S, G-09D, and G-10S between the third quarter 2013 and the third quarter of 2018, eight additional quarters of monitoring will be conducted to determine if a reduction to semiannual sampling frequency is warranted at those wells. Additionally, low vinyl chloride concentrations detected in those wells historically will be further evaluated during the additional quarterly monitoring period.

- **Landfill Gas Monitoring:** Quarterly monitoring at all currently monitored gas probes, barholes, vaults, and lift stations will be maintained, and new soil gas probe GP-6 will be integrated into the gas probe monitoring program to monitor for landfill gas migration on the northern edge of the Cathcart property, near the closest residences. Monitoring results will be included in the semiannual monitoring reports.
- **Surface Water Sampling:** Sample frequency at all monitoring points was reduced to semiannual; two monitoring points (CC-D1 and CC-J) were eliminated from the surface water monitoring program based on redundancy/accessibility concerns for those locations. Monitoring results will be included in the semiannual monitoring reports. Chemical analytical suites remain unchanged.

1.2.1 Groundwater Monitoring Network

Currently, a total of 17 groundwater monitoring wells (*eight shallow wells and nine deep wells*), are monitored on a semiannual basis. Of these wells, four-(4) are considered upgradient, and 13 are considered to be within the landfill footprint or downgradient site wells. Well locations are shown on the **Monitoring Network Map (Figure 5)**. Groundwater monitoring results are summarized in **Section 2.0** of this report.

1.2.2 Surface Water Monitoring Network

Surface water monitoring stations have been established along Garden Creek and in the site stormwater detention ponds per the **SAP**. The seven surface water sampling locations consist of one-(1) sampling location upgradient of the site and six sampling locations within and downgradient of the site. Sampling locations are shown on **Monitoring Network Map (Figure 5)**. Semiannual surface water monitoring results are summarized in **Section 3.0** of this report.

1.2.3 Landfill Gas Monitoring Network

Per the **SAP**, landfill gas monitoring is conducted quarterly and includes measurement of methane, oxygen, and carbon dioxide. The existing gas monitoring system consists of eight gas probes, six permanently-installed barhole probes, seven vaults, 19 manholes, and two lift stations, which surround the landfill. The gas monitoring locations are shown on the **Monitoring Network Maps (Figures 5 and 5a)**. Quarterly landfill gas monitoring results are summarized and discussed in **Section 4.0** of this report.

2.0 GROUNDWATER MONITORING

The second semiannual groundwater monitoring events for 2019 were performed by Snohomish County personnel on July 30 and October 22 and 23, 2019.

Depths to water were measured and groundwater samples were collected in accordance with the approved **SAP**. Hydrographs of the historical and current groundwater elevations and precipitation totals are included in **Appendix A**. The **First Semiannual 2019 Groundwater Measurements** and comparison with the previous monitoring event elevation data (*delta*) are shown in *Table 1* below.

Table 1 – First Semiannual 2019 Groundwater Measurements

Well Number	Sample Date	Top of Casing Elevation (feet above MSL)	Water Elevation (feet above MSL)	Delta* (feet)
Shallow Wells – Third Quarter 2019				
G-09S	7/30/19	273.08	241.57	-1.78
G-10S	7/30/19	266.94	242.11	-2.01
Shallow Wells – Fourth Quarter 2019				
G-01A	10/23/19	229.00	220.79	0.56
G-04A	10/22/19	286.52	272.42	0.76
G-08D1	10/22/19	222.02	198.71	-1.10
G-09S	10/23/19	273.08	241.27	-0.30
G-10S	10/23/19	266.94	244.18	2.07
G-11S	10/22/19	250.74	232.70	0.47
G-14S	10/22/19	328.76	313.94	-5.52
G-24S	10/23/19	321.13	307.36	-0.39
Deep Wells – Third Quarter 2019				
G-09D	7/30/19	274.60	219.72	-3.42
G-10D	7/30/19	268.32	236.77	-1.51
Deep Wells – Fourth Quarter 2019				
G-01D	10/23/19	229.96	206.29	0.42
G-02D	10/22/19	242.10	210.50	-4.41
G-06B	10/22/19	246.24	212.02	0.13
G-08D2	10/22/19	221.62	213.64	-4.74
G-09D	10/23/19	274.60	221.10	1.38
G-10D	10/23/19	268.32	237.83	1.06
G-13D	10/22/19	232.17	221.37	0.72
G-14D	10/22/19	329.58	298.14	-0.30
G-24D	10/23/19	320.51	301.49	1.07

MSL = Mean sea level

* Delta = Change in groundwater elevation from previous sampling event; wells 09S/09D and 10S/10D are sampled quarterly

Groundwater Contour Maps for the shallow and deep zones during 2019 (*i.e.*, for the second and fourth quarter monitoring events) are included as **Figures 6a through 6d** of this report.

2.2 GROUNDWATER SAMPLING

Four wells were sampled during the first and third quarters (G-09S, G-09D, G-10S, and G-10D) and 17 wells were purged and sampled during the second and fourth quarters in accordance with the procedures outlined in the **SAP** and the modified schedule approved Variance. Well performance was consistent with recent sampling events at all wells.

Samples were transported to Am Test, Inc. of Kirkland, Washington under chain-of-custody for analysis of dissolved metals, volatile organic compounds (VOCs), and conventional chemistry parameters. The analytical results are tabulated in **Appendix B** of this report and discussed below.

2.3 EVALUATION OF GROUNDWATER ANALYTICAL RESULTS

Each of the groundwater samples collected during 2019 are compared to the applicable groundwater quality standards which are summarized in **Tables 2 and 3** below and in **Appendix B**. Notable observations or deviations from scope are noted below:

2.3.1 Shallow Wells

- The iron concentration in well G-09S increased significantly from the first quarter (0.03 mg/L) to the second quarter 2019 (11.2 mg/L), and remained elevated through the third quarter (12.0 mg/L). During the fourth quarter, the iron concentration decreased to 0.024 mg/L, which was below the iron groundwater standard of 0.3 mg/L. Similarly, the iron concentration in well G-04A increased from 0.014 mg/L during the second quarter event to 22.3 mg/L during the fourth quarter event.
- The low VOC concentrations detected in shallow wells during the fourth quarter 2018 sampling event were not present in any wells during the first semiannual sampling events. Low concentrations of toluene were present in five shallow wells (including G-01A, G-04A, G-09S, G-10S, and upgradient well G-24S) during the fourth quarter 2019 monitoring event. In addition, well G-04A contained a low concentration of acetone (5.1 µg/L) during the fourth quarter 2019 event.

Table 2 – Summary of Annual 2019 Shallow Well Standard Exceedances

Well Type	Well ID	Sample Date	Parameter	Units	Result	Groundwater Standard
Downgradient	G-01A	4/24/19	pH Arsenic	std units mg/L	6.14 0.000204	6.5-8.5 0.00005
	G-01A	10/23/19	pH Arsenic	std units mg/L	6.23 0.000212	6.5-8.5 0.00005
	G-04A	4/24/19	pH Sodium Arsenic	std units mg/L mg/L	6.09 182 0.00336	6.5-8.5 20 0.00005
	G-04A	10/22/19	pH Arsenic Iron Manganese	std units mg/L mg/L mg/L	6.03 0.0215 22.3 6.04	6.5-8.5 0.00005 0.3 0.05
	G-08D1	4/23/19	pH Sodium Arsenic Iron	std units mg/L mg/L mg/L	9.68 109 0.00132 1.39	6.5-8.5 20 0.00005 0.3
	G-08D1	10/22/19	pH Sodium Arsenic Iron	std units mg/L mg/L mg/L	9.59 107 0.00208 0.902	6.5-8.5 20 0.00005 0.3
	G-09S	1/15/19	Conductivity pH Sodium	µmhos/cm std units mg/L	1,000 6.25 80.6	700 6.5-8.5 20

Table 2 – Summary of Annual 2019 Shallow Well Standard Exceedances

Well Type	Well ID	Sample Date	Parameter	Units	Result	Groundwater Standard
Downgradient			TDS	mg/L	690	500
			Arsenic	mg/L	0.000927	0.00005
			Manganese	mg/L	0.663	0.05
	G-09S	4/23/19	Conductivity	µmhos/cm	920	700
			pH	std units	6.27	6.5-8.5
			Sodium	mg/L	195	20
			TDS	mg/L	660	500
			Arsenic	mg/L	0.000768	0.00005
			Iron	mg/L	11.2	0.3
			Manganese	mg/L	3.319	0.05
	G-09S	7/30/19	Conductivity	µmhos/cm	970	700
			pH	std units	6.22	6.5-8.5
			Sodium	mg/L	82.1	20
			TDS	mg/L	670	500
			Arsenic	mg/L	0.00645	0.00005
			Iron	mg/L	12.0	0.3
		Manganese	mg/L	3.289	0.05	
G-09S	10/23/19	Conductivity	µmhos/cm	950	700	
		pH	std units	6.16	6.5-8.5	
		Sodium	mg/L	87	20	
		TDS	mg/L	560	500	
		Arsenic	mg/L	0.000659	0.00005	
G-10S	1/15/19	Conductivity	µmhos/cm	1400	700	
		pH	std units	6.46	6.5-8.5	
		Sodium	mg/L	164	20	
		Sulfate	mg/L	390	250	
		TDS	mg/L	970	500	
		Arsenic	mg/L	0.00813	0.00005	
		Iron	mg/L	11.0	0.3	
		Manganese	mg/L	3.750	0.05	
G-10S	4/23/19	Conductivity	µmhos/cm	1300	700	
		Sodium	mg/L	195	20	
		Sulfate	mg/L	283	250	
		TDS	mg/L	980	500	
		Arsenic	mg/L	0.00576	0.00005	
		Iron	mg/L	11.2	0.3	
		Manganese	mg/L	3.32	0.05	
G-10S	7/30/19	Conductivity	µmhos/cm	1400	700	
		Sodium	mg/L	174	20	
		Sulfate	mg/L	279	250	
		TDS	mg/L	970	500	
		Arsenic	mg/L	0.00645	0.00005	
		Iron	mg/L	12.0	0.3	
		Manganese	mg/L	3.289	0.05	
G-10S	10/23/19	Conductivity	µmhos/cm	1400	700	
		Sodium	mg/L	186	20	
		Sulfate	mg/L	323	250	
		TDS	mg/L	930	500	
		Arsenic	mg/L	0.00604	0.00005	

Table 2 – Summary of Annual 2019 Shallow Well Standard Exceedances

Well Type	Well ID	Sample Date	Parameter	Units	Result	Groundwater Standard
Downgradient	G-10S	10/23/19	Iron	mg/L	9.68	0.3
			Manganese	mg/L	3.01	0.05
	G-11S	4/24/19	Sodium Arsenic	mg/L mg/L	50.1 0.00074	20 0.00005
Upgradient	G-14S	4/23/19	pH	std units	9.31	6.5-8.5
			Sodium Arsenic	mg/L mg/L	104 0.00275	20 0.00005
	G-14S	10/22/19	pH	std units	9.13	6.5-8.5
			Sodium Arsenic	mg/L mg/L	107 0.00344	20 0.00005
G-24S	4/24/19	Sodium Arsenic	mg/L mg/L	78.6 0.000619	20 0.00005	
		G-24S	10/23/19	Sodium Arsenic	mg/L mg/L	92.1 0.000781

2.3.2 Deep Wells

- The low VOC concentrations detected in deep wells during the fourth quarter 2018 were not present in any wells during the first semiannual 2019 sampling events. Low concentrations of toluene were present in four deep wells (including G-09D, G-10D, and upgradient wells and G-24D) during the fourth quarter 2019 monitoring event. In addition, upgradient deep zone well G-14D contained a low concentration of methylene chloride (2.3 µg/L) during the fourth quarter 2019 event.
- The sodium concentration in well G-06B decreased significantly from the fourth quarter 2018 (167 mg/L) to the second quarter 2019 (10.8 mg/L).
- The iron and manganese concentrations in well G-06B increased significantly from the fourth quarter 2018 sampling event to the second quarter 2019 event.

Table 3 – Summary of Annual 2019 Deep Well Standard Exceedances

Well Type	Well ID	Sample Date	Parameter	Units	Result	Groundwater Standard
Downgradient	G-01D	4/24/19	pH	std units	9.18	6.5-8.5
			Sodium	mg/L	156	20
			Arsenic	mg/L	0.000301	0.00005
	G-01D	10/23/19	pH	std units	9.29	6.5-8.5
			Sodium	mg/L	153	20
			Arsenic	mg/L	0.000641	0.00005
	G-02D	4/23/19	Sodium	mg/L	84.4	20
			Arsenic	mg/L	0.00278	0.00005
Lead			mg/L	0.155	0.05	
G-02D	10/22/19	Sodium	mg/L	87.9	20	
		Arsenic	mg/L	0.00365	0.00005	
		Lead	mg/L	0.491	0.05	

Table 3 – Summary of Annual 2019 Deep Well Standard Exceedances

Well Type	Well ID	Sample Date	Parameter	Units	Result	Groundwater Standard
Downgradient	G-06B	4/24/19	Arsenic Iron Manganese	mg/L mg/L mg/L	0.0162 14.7 4.18	0.00005 0.6 0.05
	G-06B	10/22/19	Arsenic Iron Manganese	mg/L mg/L mg/L	0.0162 14.7 4.18	0.00005 0.6 0.05
	G-08D2	4/23/19	pH Sodium Arsenic Iron	std units mg/L mg/L mg/L	9.90 109 0.00156 1.3	6.5-8.5 20 0.00005 0.3
	G-08D2	10/22/19	pH Sodium Arsenic Iron	std units mg/L mg/L mg/L	9.93 110 0.000811 0.796	6.5-8.5 20 0.00005 0.3
	G-09D	1/15/19	pH Sodium Arsenic	std units mg/L mg/L	9.20 138 0.00521	6.5-8.5 20 0.00005
	G-09D	4/23/19	pH Sodium Arsenic	std units mg/L mg/L	9.27 165 0.00397	6.5-8.5 20 0.00005
	G-09D	7/30/19	pH Sodium Arsenic	std units mg/L mg/L	9.29 156 0.00499	6.5-8.5 20 0.00005
	G-09D	10/23/19	Conductivity Sodium Arsenic	µmhos/cm mg/L mg/L	830 189 0.00278	700 20 0.00005
	G-10D	1/15/19	Conductivity Sodium Sulfate TDS Arsenic Iron Manganese	µmhos/cm mg/L mg/L mg/L mg/L mg/L mg/L	1,600 305 442 1,100 0.00195 0.687 0.4555	700 20 250 500 0.00005 0.3 0.05
	G-10D	4/23/19	Conductivity Sodium Sulfate TDS Arsenic Iron Manganese	µmhos/cm mg/L mg/L mg/L mg/L mg/L mg/L	1,400 382 319 920 0.00124 0.662 0.3847	700 20 250 500 0.00005 0.3 0.05
	G-10D	7/30/19	Conductivity Sodium Sulfate TDS Arsenic Iron Manganese	µmhos/cm mg/L mg/L mg/L mg/L mg/L mg/L	1600 324 270 970 0.00117 0.590 0.3581	700 20 250 500 0.00005 0.3 0.05

Table 3 – Summary of Annual 2019 Deep Well Standard Exceedances

Well Type	Well ID	Sample Date	Parameter	Units	Result	Groundwater Standard	
Downgradient	G-10D	10/23/19	Conductivity	µmhos/cm	1600	700	
			Sodium	mg/L	363	20	
			Sulfate	mg/L	293	250	
			TDS	mg/L	1000	500	
			Arsenic	mg/L	0.00123	0.00005	
			Iron	mg/L	0.517	0.3	
Downgradient	G-13D	4/24/19	pH	std units	9.30	6.5-8.5	
			Sodium	mg/L	99.6	20	
			Arsenic	mg/L	0.000206	0.00005	
Downgradient	G-13D	10/22/19	pH	std units	9.37	6.5-8.5	
			Sodium	mg/L	102	20	
			Arsenic	mg/L	0.0001	0.00005	
Upgradient	G-14D	4/23/19	pH	std units	9.85	6.5-8.5	
			Sodium	mg/L	120	20	
			Arsenic	mg/L	0.000697	0.00005	
			Iron	mg/L	0.959	0.3	
	Upgradient	G-14D	10/22/19	pH	std units	9.74	6.5-8.5
				Sodium	mg/L	122	20
				Arsenic	mg/L	0.000839	0.00005
				Iron	mg/L	0.729	0.3
Upgradient	G-24D	4/24/19	pH	std units	8.59	6.5-8.5	
			Sodium	mg/L	111	20	
	Upgradient	G-24D	10/23/19	Arsenic	mg/L	0.000095	0.00005
				pH	std units	8.61	6.5-8.5
Upgradient	G-24D	10/23/19	Sodium	mg/L	127	20	

2.4 STATISTICAL EVALUATION

Where exceedances to the WAC groundwater standards occur, statistical analysis is performed as specified in the **SAP** using **DUMPStat Statistical Software (Version 3.0 by Robert D. Gibbons Ltd., 2018)** to determine the significance of the change.

Details regarding the statistical analyses are found in the SAP and in monitoring reports submitted prior to 2019. Per **Ecology** and **Snohomish Health District** request, the statistical prediction limits for each groundwater zone were updated in the first quarter of the year and subsequent data sets were compared against that prediction limit. However, since the first semiannual monitoring event for all wells did not occur until the second quarter, the prediction limits will be updated annually following the first quarter monitoring event for wells G-09S, G-09D, and G-10S, and for all wells following the second quarter sampling event.

2.4.1 Shallow Groundwater Well Statistical Results

Analytes that exceeded the calculated prediction limits in the shallow zone wells and the observed concentration trends are summarized in **Tables 4 and 5** below and **Appendix B**. Plots of the shallow zone groundwater statistical analyses are included in **Appendix C**.

Table 4 – Summary of Annual 2019 Shallow Well Prediction Limit Exceedances

Well Type	Well ID	Sample Date	Parameter	Units	Result	Prediction Limit
Downgradient	G-01A	4/24/19	None	--	--	--
	G-01A	10/23/19	None	--	--	--
	G-04A	4/24/19	Alkalinity	mg/L	260	200
			Bicarbonate	mg/L	260	200
			Conductivity	µmhos/cm	680	540
			Sodium	mg/L	182	125.7257
			TDS	mg/L	450	404.1141
			TOC	mg/L	45.0	22
	G-04A	10/22/19	Alkalinity	mg/L	270	200
			Bicarbonate	mg/L	270	200
			Calcium	mg/L	43.1	23.8314
			COD	mg/L	41	28
			Arsenic	mg/L	0.0215	0.004
			Cobalt	mg/L	0.015	0.003
			Iron	mg/L	22.3	12.9457
			Manganese	mg/L	6.04	4.7921
	G-08D1	4/23/19	None	--	--	--
G-08D1	10/22/19	None	--	--	--	
G-09S	1/15/19	Alkalinity	mg/L	310	200	
		Bicarbonate	mg/L	310	200	
		Calcium	mg/L	86.8	23.9949	
		Conductivity	µmhos/cm	1,000	540	
		Potassium	mg/L	5.05	2.7196	
		Sodium	mg/L	249	125.8433	
		TDS	mg/L	690	405.899	
		Selenium	mg/L	0.00254	0.002	
G-09S	4/23/19	Alkalinity	mg/L	330	200	
		Bicarbonate	mg/L	330	200	
		Calcium	mg/L	102	23.8314	
		Conductivity	µmhos/cm	920	540	
		Potassium	mg/L	3.68	2.7105	
		Sodium	mg/L	195	125.7257	
		TDS	mg/L	660	404.1141	
G-09S	7/30/19	Alkalinity	mg/L	360	200	
		Bicarbonate	mg/L	360	200	
		Calcium	mg/L	77.9	23.8314	
		Chloride	mg/L	18.8	18.3	
		Conductivity	µmhos/cm	970	540	
		Potassium	mg/L	4.72	2.7105	
		TDS	mg/L	670	404.1141	
G-09S	10/23/19	Alkalinity	mg/L	360	200	
		Bicarbonate	mg/L	360	200	
		Calcium	mg/L	76	23.8314	
		COD	µmhos/cm	29	28	
		Conductivity	mg/L	950	540	
		Potassium	mg/L	4.41	2.7105	
		TDS	mg/L	560	404.1141	

Table 4 – Summary of Annual 2019 Shallow Well Prediction Limit Exceedances

Well Type	Well ID	Sample Date	Parameter	Units	Result	Prediction Limit
Downgradient	G-10S	1/15/19	Alkalinity	mg/L	440	200
			Bicarbonate	mg/L	440	200
			Calcium	mg/L	109	23.9949
			Conductivity	µmhos/cm	1,400	540
			Potassium	mg/L	3.87	2.7196
			Sodium	mg/L	164	125.8433
			Sulfate	mg/L	390	135.0174
			TDS	mg/L	970	405.899
			Arsenic	mg/L	0.00813	0.004
	G-10S	4/23/19	Alkalinity	mg/L	410	200
			Bicarbonate	mg/L	410	200
			Calcium	mg/L	96.6	23.8314
			Conductivity	µmhos/cm	1,300	540
			Potassium	mg/L	3.68	2.7105
			Sodium	mg/L	195	125.7257
			TDS	mg/L	980	404.1141
Arsenic			mg/L	0.00576	0.004	
G-10S			7/30/19	Alkalinity	mg/L	420
	Bicarbonate	mg/L		420	200	
	Calcium	mg/L		107	23.8314	
	Conductivity	µmhos/cm		1400	540	
	Potassium	mg/L		3.60	2.7105	
	Sodium	mg/L		174	125.7257	
	Sulfate	mg/L		279	288.1075	
	TDS	mg/L		970	404.1141	
	Arsenic	mg/L		0.00645	0.004	
G-10S		Alkalinity	mg/L	440	200	
		Bicarbonate	mg/L	440	200	
		Calcium	mg/L	100	23.8314	
		Conductivity	µmhos/cm	1400	540	
		Potassium	mg/L	3.38	2.7105	
		Sodium	mg/L	186	125.7257	
		Sulfate	mg/L	323	288.1075	
		TDS	mg/L	930	404.1141	
		Arsenic	mg/L	0.00604	0.004	
G-11S	4/24/19	None	--	--	--	
	10/22/19	None	--	--	--	
Upgradient	G-14S	4/23/19	None	--	--	
	G-14S	10/22/19	None	--	--	
	G-24S	4/24/19	None	--	--	
	G-24S	10/23/19	None	--	--	

Significant increasing and decreasing concentration trends for the second semiannual 2019 monitoring events and for 2019 overall were noted in shallow groundwater, as summarized in **Table 5** below.

Table 5 – Significant Trends, Shallow Wells 2019

Well	Date	Significant Trends			
		Second Semiannual 2019		2019 Overall	
		Increasing	Decreasing	Increasing	Decreasing
Downgradient Wells					
G-01A	10/23/19	None	Sodium	Nitrate	Sodium
G-04A	10/22/19	Chloride, arsenic , iron	None	Chloride, arsenic, iron	None
G-08D1	10/22/19	Calcium, iron, potassium	Chloride, nitrite, TOC	Calcium, iron, potassium	Chloride, nitrite, TOC
G-09S	7/30/19	Alkalinity, bicarbonate	Calcium, chloride, magnesium, sodium	Alkalinity, bicarbonate	Calcium, chloride, conductivity, magnesium, sodium, TDS
G-09S	10/23/19	Alkalinity, bicarbonate	Calcium, chloride, conductivity , magnesium, sodium, TDS		
G-10S	7/30/19	Arsenic	Calcium, chloride, magnesium, sodium, TOC, manganese	Arsenic	Calcium, chloride, magnesium, sodium, TOC, manganese
G-10S	10/23/19	Arsenic	Calcium, chloride, magnesium, sodium, manganese		
G-11S	10/22/19	None	Alkalinity, bicarbonate, conductivity, sodium, sulfate, TDS	None	Alkalinity, bicarbonate, conductivity, sodium, sulfate, TDS
Upgradient Wells					
G-14S	10/22/19	Calcium, iron, pH	Chloride, conductivity, sodium, nitrate, sulfate, TDS	Calcium, iron, potassium, pH	Chloride, conductivity, sodium, nitrate, sulfate, TDS
G-24S	10/23/19	None	Arsenic, barium	None	Arsenic, barium

Constituents in **bold** (if any) indicate a new trend noted since the previous monitoring period

Decreasing trends in the shallow wells outnumbered increasing trends during all four 2019 sampling events, including the first quarter sampling event (10 decreasing/3 increasing), second

quarter event (26 decreasing/13 increasing), third quarter sampling event (10 decreasing/3 increasing), and fourth quarter sampling event (29 decreasing/12 increasing). Four of the increasing trends were noted in upgradient well G-14S during the second quarter event, and three increasing trends were noted in well G-14S during the fourth quarter event.

2.4.2 Deep Groundwater Well Statistical Results

Analytes that exceeded the calculated prediction limits in the deep zone wells and the observed concentration trends for the second semiannual 2019 events are summarized in **Tables 6 and 7** below and in **Appendix B**. Plots of the deep zone groundwater statistical analyses are included in **Appendix C**.

Table 6 – Summary of Annual 2019 Deep Well Prediction Limit Exceedances

Well Type	Well ID	Sample Date	Parameter	Units	Result	Prediction Limit
Downgradient	G-01D	4/24/19	Conductivity	µmhos/cm	590	510
			Sodium	mg/L	156	125.7068
			Iron	mg/L	0.225	0.1076
	G-01D	10/23/19	Conductivity	µmhos/cm	600	510
			Sodium	mg/L	153	125.7068
	G-02D	4/23/19	Nitrate	mg/L	0.68	0.21
			Sulfate	mg/L	77.3	66.05
			Arsenic	mg/L	0.00278	0.0021
			Copper	mg/L	0.013	0.008
			Iron	mg/L	0.22	0.1076
			Lead	mg/L	0.155	0.0023
	G-02D	10/22/19	Nitrate	mg/L	0.58	0.21
			Sulfate	mg/L	73.7	66.05
Arsenic			mg/L	0.00365	0.0021	
Copper			mg/L	0.009	0.008	
Iron			mg/L	0.115	0.1076	
Lead			mg/L	0.491	0.0023	
G-06B	4/24/19	Calcium	mg/L	29.6	6.32	
		Magnesium	mg/L	18.2	2.33	
		Arsenic	mg/L	0.0162	0.0021	
		Cobalt	mg/L	0.012	0.008	
		Iron	mg/L	14.7	0.1076	
G-06B	10/22/19	Manganese	mg/L	4.18	0.0183	
		Conductivity	µmhos/cm	690	700	
		Sodium	mg/L	177	125.7068	
		Sulfate	mg/L	77.2	66.05	
G-08D2	4/23/19	Arsenic	mg/L	0.00398	0.0021	
		Iron	mg/L	1.3	0.1076	
		Manganese	mg/L	0.0366	0.0183	
G-08D2	10/22/19	Iron	mg/L	0.796	0.1076	
		Manganese	mg/L	0.034	0.0183	
G-09D	1/15/19	Conductivity	µmhos/cm	690	510	
		Sodium	mg/L	138	119	
		Sulfate	mg/L	153	66.05	
		Copper	mg/L	0.015	0.008	

Table 6 – Summary of Annual 2019 Deep Well Prediction Limit Exceedances

Well Type	Well ID	Sample Date	Parameter	Units	Result	Prediction Limit
Downgradient	G-09D	1/15/19	Nickel	mg/L	0.007	0.006
	G-09D	4/23/19	Conductivity	µmhos/cm	590	510
			Sodium	mg/L	165	125.7068
			Sulfate	mg/L	118	66.05
			Arsenic	mg/L	0.00397	0.0021
			Copper	mg/L	0.009	0.008
	G-09D	7/30/19	Chloride	mg/L	43.0	9.3634
			Conductivity	µmhos/cm	700	510
			Sodium	mg/L	156	125.7068
			Sulfate	mg/L	131	66.05
			Nickel	mg/L	0.007	0.026
	G-09D	10/23/19	Chloride	mg/L	19.3	9.3634
			Conductivity	µmhos/cm	830	510
			Sodium	mg/L	189	125.7068
			Sulfate	mg/L	160	66.05
			Arsenic	mg/L	0.00278	0.0021
			Manganese	mg/L	0.025	0.0183
	G-10D	1/15/19	Alkalinity	mg/L	500	280
		Bicarbonate	mg/L	500	280	
		Calcium	mg/L	24.2	6.32	
		Chloride	mg/L	17.4	9.4402	
		Conductivity	µmhos/cm	1,600	510	
		Magnesium	mg/L	2.07	0.31	
		Potassium	mg/L	1.73	1.6	
		Sodium	mg/L	305	119	
		Sulfate	mg/L	442	66.05	
		TDS	mg/L	1,100	480	
G-10D	4/23/19	Alkalinity	mg/L	480	280	
		Bicarbonate	mg/L	480	280	
		Calcium	mg/L	21.6	6.32	
		Chloride	mg/L	15.0	9.3634	
		Conductivity	µmhos/cm	1,400	510	
		Potassium	mg/L	1.72	1.6	
		Sodium	mg/L	382	125.7068	
		Sulfate	mg/L	319	66.05	
		TDS	mg/L	920	480	
		Iron	mg/L	0.662	0.1076	
		Manganese	mg/L	0.3847	0.0183	
G-10D	7/30/19	Alkalinity	mg/L	520	280	
		Bicarbonate	mg/L	520	280	
		Calcium	mg/L	22.0	6.32	
		Chloride	mg/L	23.0	9.3634	
		Conductivity	µmhos/cm	1600	510	
		Magnesium	mg/L	1.89	2.33	
		Potassium	mg/L	1.67	1.6	
		Sodium	mg/L	324	125.7068	
		Sulfate	mg/L	270	66.05	
		TDS	mg/L	970	480	
		Nickel	mg/L	0.009	0.026	

Table 6 – Summary of Annual 2019 Deep Well Prediction Limit Exceedances

Well Type	Well ID	Sample Date	Parameter	Units	Result	Prediction Limit
Downgradient	G-10D	10/23/19	Alkalinity	mg/L	480	280
			Bicarbonate	mg/L	480	280
			Calcium	mg/L	21.3	6.32
			Chloride	mg/L	17.9	9.3634
			Conductivity	µmhos/cm	1600	510
Downgradient	G-10D	10/23/19	Sodium	mg/L	363	125.7068
			Sulfate	mg/L	293	66.05
			TDS	mg/L	1000	480
			Iron	mg/L	0.517	0.1076
			Manganese	mg/L	0.343	0.0183
Downgradient	G-13D	4/24/19	None	--	--	--
Downgradient	G-13D	10/22/19	Chloride	mg/L	9.57	9.3634
Upgradient	G-14D	4/23/19	Iron	mg/L	0.959	0.1076
	G-14D	10/22/19	Iron	mg/L	0.729	0.1076
	G-14D	10/22/19	Vanadium	mg/L	0.01	0.008
	G-24D	4/24/19	None	--	--	--
Upgradient	G-24D	10/23/19	Sodium	mg/L	127	125.7068

The trends noted during the first semiannual event are summarized in **Table 7** below and in **Appendix B**. Decreasing trends in the deep wells outnumbered increasing trends during all four 2019 sampling events, including the first quarter sampling event (8 decreasing/0 increasing), second quarter event (28 decreasing/10 increasing), third quarter sampling event (8 decreasing/0 increasing), and fourth quarter sampling event (28 decreasing/10 increasing). Three of the increasing trends were noted in upgradient wells G-14D and G-24D during the fourth quarter event.

One increasing concentration trend was noted during the fourth quarter event that was not present during the previous monitoring event at deep well G-14D (calcium).

Table 7 – Significant Trends, Deep Wells 2019

Well	Date	Significant Trends			
		Second Semiannual 2019		2019 Overall	
		Increasing	Decreasing	Increasing	Decreasing
Downgradient Wells					
G-01D	10/23/19	None	Chloride, conductivity, sulfate	Potassium	Chloride, conductivity, sulfate
G-02D	10/22/19	Iron	Calcium, chloride, conductivity, nitrate, sodium, pH, TDS	Iron	Calcium, chloride, conductivity, nitrate, sodium, pH, TDS

Table 7 – Significant Trends, Deep Wells 2019

Well	Date	Significant Trends			
		Second Semiannual 2019		2019 Overall	
		Increasing	Decreasing	Increasing	Decreasing
G-06B	10/22/19	Arsenic, iron, potassium	Calcium, chloride, conductivity, sodium, sulfate, TDS	Arsenic, iron, potassium	Calcium, chloride, conductivity, sodium, sulfate, TDS
G-08D2	10/22/19	Iron, potassium	Chloride	Iron, potassium	Chloride
G-09D	7/30/19	None	Calcium, lead	None	Chloride, calcium, lead
G-09D	10/23/19	None	Calcium, lead		
G-10D	7/30/19	None	Calcium, chloride, magnesium, sodium, TOC, manganese	None	Calcium, chloride, magnesium, sodium, TOC, manganese
G-10D	10/23/19	None	Calcium, chloride, magnesium, TOC, manganese		
G-13D	10/22/19	Potassium	Ammonia, sulfate	Potassium	Ammonia, sulfate
Upgradient Wells					
G-14D	10/22/19	Calcium , iron	Ammonia	Calcium, iron	Ammonia
G-24D	10/23/19	pH	Chloride	pH	Chloride

Constituents in **bold** indicate a new trend noted since the previous monitoring period

3.0 SURFACE WATER MONITORING

Snohomish County performed surface water sampling during the second half of 2019 as required by the landfill permit and consistent with the **SAP** and approved Application of Variance. Although the surface water sampling frequency was reduced to semiannual, surface water samples were inadvertently collected during both the third and fourth quarters of 2019.

3.1 SURFACE WATER SAMPLING

Snohomish County field personnel collected surface water samples from one location on July 30, 2019 and from four locations on January 24, April 25, and October 23, 2019 in accordance

with the SAP procedures. The 2019 surface water analytical results were compared to applicable criteria in **Chapter 173-201A WAC** as summarized **Table 8** below.

Table 8 – Second Semiannual 2019 Surface Water Analytical Results

Parameter	Units	Criteria	CC-A1	CC-B1	CC-F	CC-NSDP
Date	--	--	1/24/19	1/24/19	1/24/19	1/24/19
Coliform	(CFU/100 mL)	200	38	28	20	ND<2
Conductivity	µmhos/cm	--	110	130	120	240
Nitrate N	mg/L	--	1.6	1.2	1.2	0.35
pH	std units	5.5-6.5	6.74	6.66	6.86	6.29
Parameter	Units	Criteria	CC-A1	CC-B1	CC-F	CC-NSDP
Date	--	--	4/25/19	4/25/19	4/25/19	4/25/19
Coliform	(CFU/100 mL)	200	44	ND<2	14	ND<2
Conductivity	µmhos/cm	--	110	130	120	170
Nitrate N	mg/L	--	0.70	0.73	0.56	ND<0.01
pH	std units	5.5-6.5	6.49	6.66	6.88	6.41
Parameter	Units	Criteria	CC-A1	CC-B1	CC-F	CC-NSDP
Date	--	--	NS	NS	NS	7/30/19
Coliform	(CFU/100 mL)	200	--	--	--	2
Conductivity	µmhos/cm	--	--	--	--	420
Nitrate N	mg/L	--	--	--	--	0.020
pH	std units	5.5-6.5	--	--	--	7.23
Parameter	Units	Criteria	CC-A1	CC-B1	CC-F	CC-NSDP
Date	--	--	10/23/19	10/23/19	10/23/19	10/23/19
Coliform	(CFU/100 mL)	200	210	130	78	9
Conductivity	µmhos/cm	--	140	140	220	150
Nitrate N	mg/L	--	0.62	0.54	0.13	0.59
pH	std units	5.5-6.5	6.97	6.43	6.53	6.51

NS = Not sampled; location dry; ND = not detected above the indicated detection limit

Nine of the 13 pH concentrations detected during the 2019 surface water sampling events slightly exceeded the surface water quality criteria. In addition, the fecal coliform concentration detected in location CC-A1 during the October sampling event slightly exceeded the surface water quality criteria.

4.0 LANDFILL GAS MONITORING

During the second semiannual sampling events, landfill gas readings were collected from eight gas probes in accordance with the SAP (Landau 2006) on September 20 and November 22, 2019. Landfill gas readings were also collected from seven vaults, six barhole probes, and two lift station vaults on those dates. The 2019 landfill gas monitoring results are summarized in separate quarterly letter reports to SHD and on the field sheets in **Appendix D**.

As shown on the field sheets, no detectable methane concentrations were detected from any of the monitoring points during 2019.

5.0 LEACHATE MONITORING

Cathcart Sanitary Landfill is authorized under City of Everett Industrial Waste Discharge Permit #7701-17 to discharge pretreated industrial wastewater (landfill leachate and vector liquid

wastes) to the City of Everett sewer system via connection through the Silver Lake Water and Sewage District sewer.

As shown on the pretreatment system flow diagram (Figure 7), landfill leachate and condensate drains to a pump station (designated SP-1), from which the leachate and condensate are pumped to a grit chamber and combined with groundwater from the landfill underdrain system to pump station SP-1. The combined leachate and groundwater is then pumped through a flow meter vault (designated P-FV-2), where the total daily flow is measured using an electromagnetic flow meter (mag meter). The flow is then discharged into either of two pretreatment lagoons. The lagoons are constructed of concrete equipped with underdrain systems that are connected to leak detection vaults (designated P-MH-3 and P-MH-4), which are monitored monthly for the presence of liquid, which could indicate a leak from the lagoons. A total of 16 manholes and vaults within the leachate collection system are monitored monthly for the presence of excess sediment (or fluid, in the case of leak detection vaults) and maintenance issues. The completed inspection forms are included in **Appendix D**.

The maximum design capacity of each lagoon is approximately 2.5 million gallons. Combined leachate and vector liquid is treated in one or both of the leachate collection lagoons by settlement and aeration. Each lagoon has two aerators installed, which operate hourly for 15 minutes. The aerated liquid is then routed via a sampling vault (P-MH-9) to a discharge point to the sewer. Liquid samples are collected from P-MH-9 on a monthly basis and the results are summarized in a monthly report, which is submitted to the City of Everett per the IWDP permit.

During 2019, a total of 2,258,300 gallons of landfill leachate were pumped to the pretreatment lagoons for treatment and eventual discharge to the sewer. Leachate was pumped to the pretreatment lagoons at an average rate of 188,192 gallons per month, which varied from 73,400 gallons in September to 405,400 gallons in January. Overall, the rate of leachate production and flow correlates with seasonal rainfall totals. The leachate flow totals are included in **Table 9** below.

Table 9 – Cathcart Landfill Leachate Flow Totals, 2019

Month	Total (gallons)
January	405,400
February	300,100
March	370,000
April	226,700
May	205,200
June	112,400
July	108,300
August	89,100
September	73,400
October	74,900
November	103,700

Table 9 – Cathcart Landfill Leachate Flow Totals, 2019

Month	Total (gallons)
December	189,100
Maximum:	405,400
Minimum:	73,400
Monthly Average:	188,192
2019 Total:	2,258,300

5.1 LEACHATE SAMPLING

On January 15, 2019, Snohomish County Solid Waste personnel collected annual samples from the leachate pump station vaults designated SP-1 and SP-4 to characterize leachate from above (SP-1) and below (SP-4) the landfill liner. The leachate samples were analyzed for the following constituents:

- pH by USEPA Method 150.2
- Biological oxygen demand (BOD) by Method SM 5210B
- Conductivity by Method SM 2510B
- Total cyanide by USEPA Method 335.4
- Oil and Grease (HEM) by USEPA Method 1664 HEM
- Total Petroleum Hydrocarbons (Polar/Non-Polar) by USEPA Method 1664 SGT-HEM
- Total Suspended Solids (TSS) by Method SM 2540D
- Flashpoint by USEPA Method 1020
- Metals by USEPA Method 200.7/245.1, including:
 - Arsenic
 - Cadmium
 - Chromium
 - Copper
 - Mercury
 - Lead
 - Nickel
 - Silver
 - Zinc

In addition, the sample from vault SP-1 was analyzed for the standard groundwater constituent suite and priority pollutants, which included:

- Total Phenol by EPA Method 420.4
- Metals by USEPA Methods 200.8/245.1, including the above-listed metals and:
 - Antimony
 - Beryllium
 - Selenium
 - Thallium

- VOCs by USEPA Method 8260/8260 SIM/624
- Semivolatile Organic Compounds (SVOCs) by USEPA Method 625/625-SIM
- Polynuclear Aromatic Hydrocarbons (PAHs) by USEPA Method 625-SIM
- Organochlorine Pesticides (OCPs) by USEPA Method 608
- Polychlorinated Biphenyls (PCBs) by USEPA Method 608

Tabulated summaries of the leachate vault sample analytical results are included below as Tables 10 through 13. Only constituents that were detected are shown in the tables; none of the leachate vault samples collected during the current monitoring year contained detectable concentrations of SVOCs, OPPs, or PCBs.

Table 10 – Leachate Vault Results – Inorganics

Location ID	Date	pH	BOD	Total Cyanide	Conductivity	TSS
Units		std. units	mg/L	mg/L	µmhos/cm	mg/L
SP-1	1/15/19	6.17	34	<0.005	940	510
SP-4	1/15/19	6.29	32	<0.005	680	2.0

Table 11 – Leachate Vault Results – Inorganics

Location ID	Date	Arsenic	Cadmium	Mercury	Nickel	Selenium	Zinc
Units		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
SP-1	1/15/19	3.6	0.108	0.06	7.0	13.2	54.8
SP-4	1/15/19	<5	<0.5	<0.05	0.006	--	0.0101

-- = not analyzed

Table 12 – Leachate Vault Results – VOCs

Location ID	Date	1,4-dichlorobenzene	Acetone	Benzene	Chlorobenzene	Vinyl chloride
Units		µg/L	µg/L	µg/L	µg/L	µg/L
SP-1	1/15/19	2.2	6.4	1.5	2.27	0.44

Table 13 – Leachate Vault Results – PAHs

Location ID	Date	1-Methylnaphthalene	2-Methylnaphthalene	Acenaphthene	Fluorene	Naphthalene
Units		µg/L	µg/L	µg/L	µg/L	µg/L
SP-1	1/15/19	2.2	6.4	1.5	2.27	0.44

6.0 SUMMARY AND RECOMMENDATIONS

6.1 SUMMARY

The groundwater, surface water, leachate, and landfill gas monitoring data collected during the 2019 monitoring events indicate the following:

- The measured groundwater elevations, flow direction, and gradient measured during the 2019 semiannual monitoring events were generally consistent with those measured historically at the site.
- The most common groundwater standard exceedances were pH, sodium, and arsenic, which is consistent with historical site data.

- Three shallow wells (G-04A, G-09S, and G-10S) contained constituent concentrations that exceeded their respective statistical limits, which is consistent with recent historical data.
- Overall, significantly more decreasing trends were noted in both zones during all four monitoring events (*75 decreasing/31 increasing trends in the shallow zone, and 72 decreasing/20 increasing trends in the deep zone*).
- Twenty-six of the 28 decreasing concentration trends noted in the deep zone during the second and fourth quarters occurred in downgradient wells; two of the increasing trends noted during the second quarter and three of the increasing trends noted during the fourth quarter occurred in upgradient wells G-14D and G-24D.
- Low concentrations of toluene were present in five shallow wells (*including G-01A, G-04A, G-09S, G-10S, and upgradient well G-24S*) during the fourth quarter 2019 monitoring event. In addition, well G-04A contained a low concentration of acetone (*5.1 µg/L*) during the fourth quarter 2019 event. Low concentrations of toluene (*1.0 µg/L*) and vinyl chloride (*0.2 µg/L*) were detected in the first quarter 2019 sample from deep well G-09D.
- Slight exceedances of the surface water quality goals for pH were noted in four of the five surface water samples collected during 2019. Additionally, surface water sample CC-A1 contained a fecal coliform concentration (*210 colony-forming units per 100 milliliters [CFU/100 mL]*) that slightly exceeded the surface water quality goal of 200 CFU/100 mL.
- The monitoring results at the perimeter gas probe locations did not indicate the presence of detectable concentrations of landfill gas during 2019.
- Landfill settlement surveys were discontinued in 2019 after six years of annual measurements. During the previous six years, no significant settlement was noted across the landfill mass that exceeded tolerance levels established in the Department of Ecology's Uniform Guidance document.

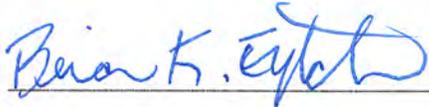
6.2 CONCLUSIONS/RECOMMENDATIONS

- The groundwater elevation data and fluctuations with seasonal rainfall totals (*as shown on the hydrographs in Appendix A*) suggest that the shallow and deep groundwater zones are hydraulically continuous and may in fact represent one complex water-bearing zone.
- There is no indication of groundwater impacts extending beyond the site boundaries of the Cathcart Landfill.
- The analytical data indicate that there is likely a leachate impact in monitoring wells G-09S, G-09D, G-10S, and G-10D.
- In accordance with the SAP and the approved variance, Snohomish County Solid Waste will continue to monitor groundwater and surface water semiannually.
- Groundwater at wells G-09S, G-09D, and G-10S will continue to be monitored quarterly through the second quarter of 2020 (*i.e., eight quarters from the resumption of sampling at those wells in the second quarter of 2018*) before evaluating a possible sampling frequency reduction at those wells.
- Following installation of new landfill gas probe GP-6 adjacent to residences northwest of the landfill, landfill gas will continue to be monitored quarterly until the stratigraphy and

hydrogeology of the site are evaluated for landfill gas migration potential and the data from GP-6 confirms that landfill gas is not migrating near the northwest perimeter of the landfill.

- The SAP is in the process of being updated to better reflect existing landfill conditions and revised monitoring frequency and conditions detailed in the approved variance.

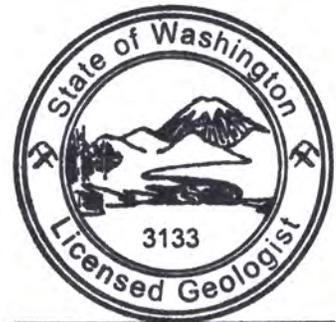
6.3 SIGNATURES AND LICENSES



Brian K. Eytcheson, LG
SCPW – Solid Waste Division

3/19/20

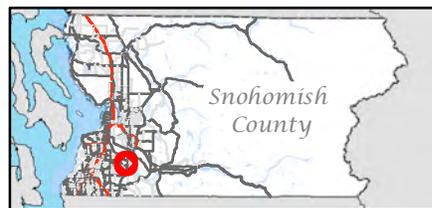
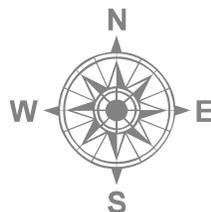
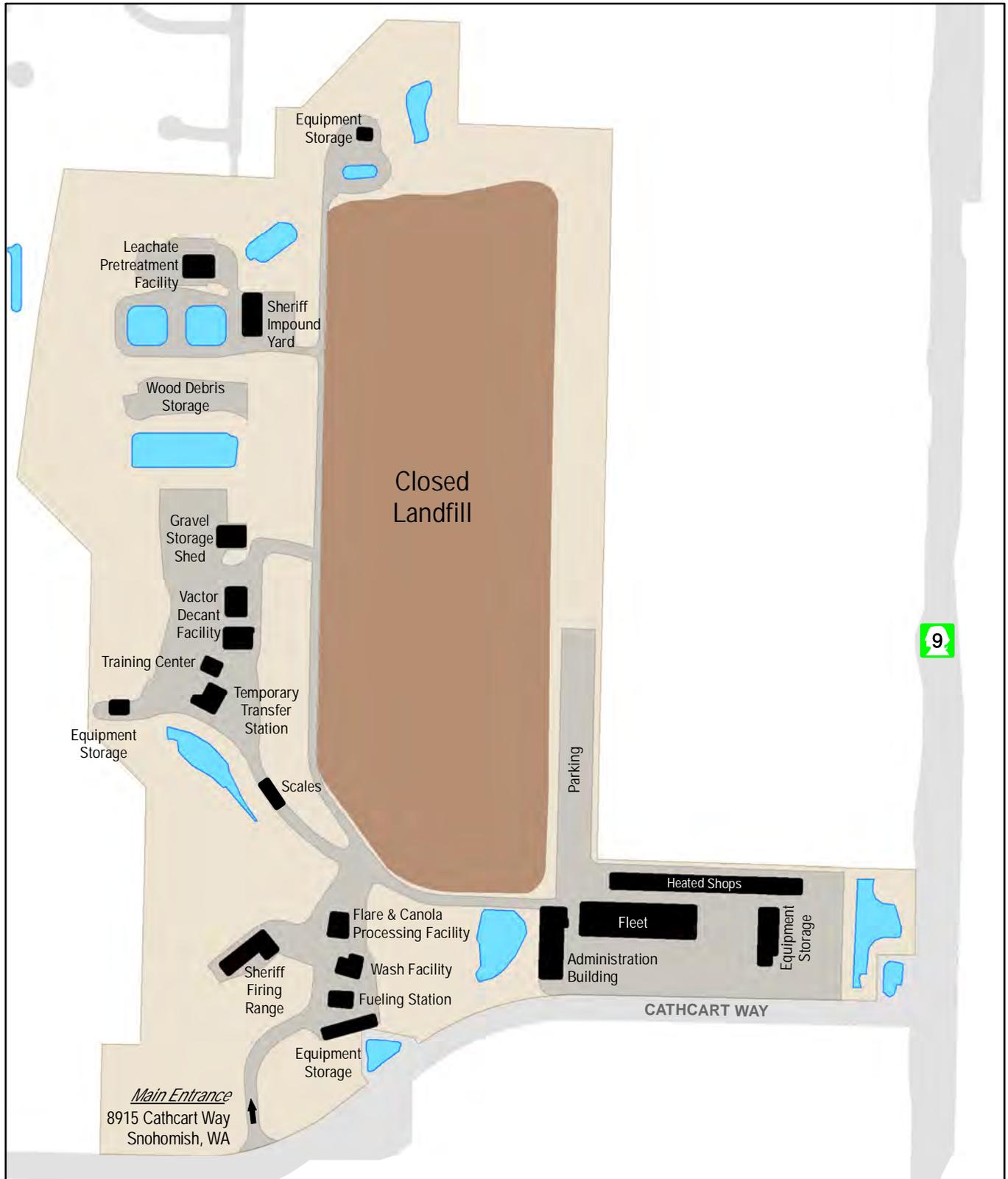
Date



BRIAN K. EYTCHESON

Figures

Cathcart Landfill Site Map

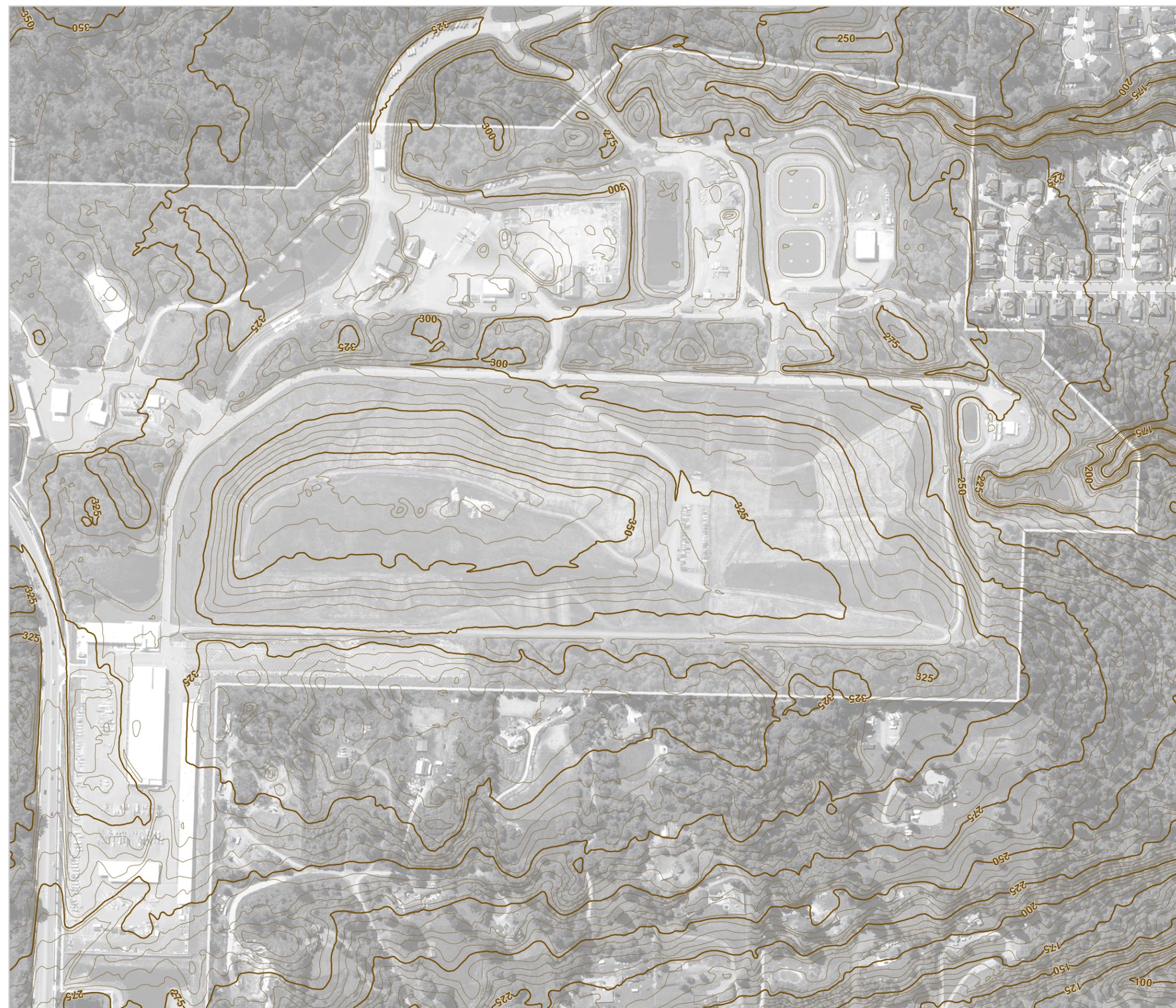



Snohomish County
 Public Works
 Solid Waste Division
 March 16, 2010

Snohomish County disclaims any warranty of merchantability or warranty of fitness of this map for any particular purpose, either express or implied. No representation or warranty is made concerning the accuracy, currency, completeness or quality of data depicted on this map. Any use of the map assumes all responsibility for use thereof, and further agrees to hold Snohomish County harmless from and against any damage, loss, or liability arising from any use of this map.

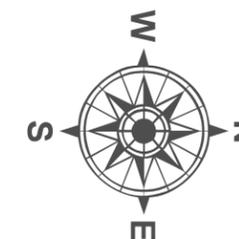
Figure 3

Cathcart Landfill Topography

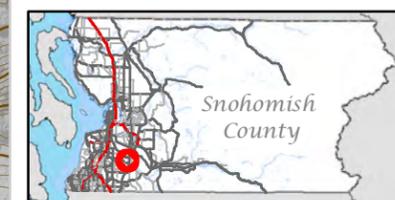
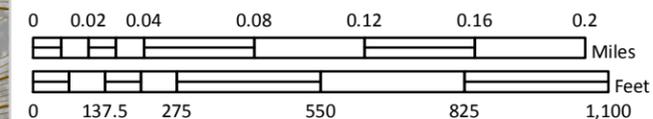


Map Features

-  Parcel Boundary
-  Subject Property Boundary
-  5 Foot Contours



1 inch = 350 feet

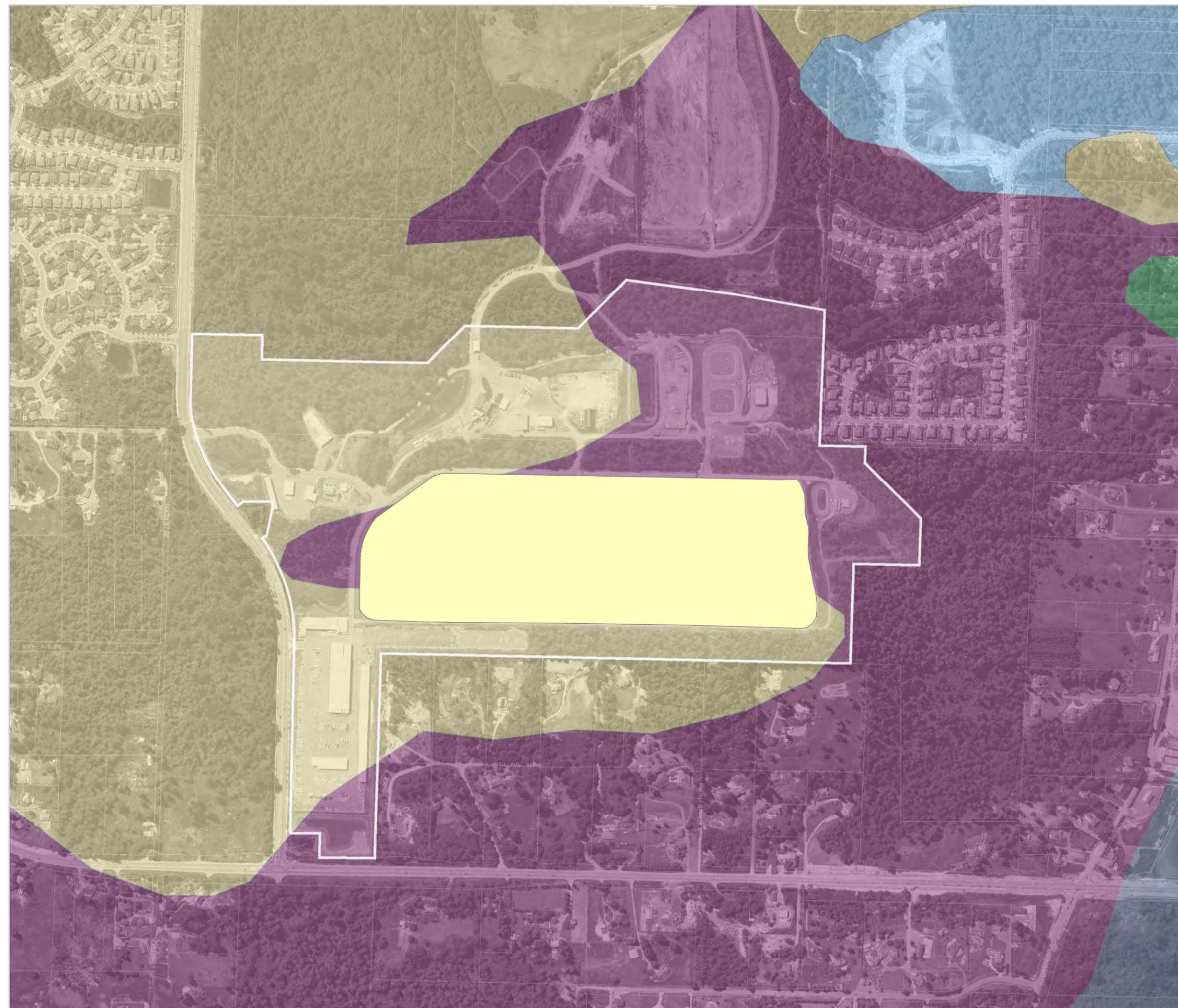



Snohomish County
Public Works
Solid Waste Division
March 24, 2010

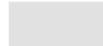
Snohomish County disclaims any warranty of merchantability or warranty of fitness of this map for any particular purpose, either express or implied. No representation or warranty is made concerning the accuracy, currency, completeness or quality of data depicted on this map. Any user of this map assumes all responsibility for use thereof, and further agrees to hold Snohomish County harmless from and against any damage, loss, or liability arising from any use of this map.

Figure 4

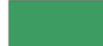
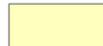
Cathcart Landfill Geologic Map

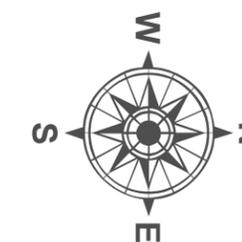


Map Features

-  Parcel Boundary
-  Subject Property Boundary

Geologic Description

-  Recent Alluvium (Qyal)
-  Vashon Recessional Outwash (Qvr)
-  Vashon Glacial Till (Qvt)
-  Vashon Advance Outwash (Qva)
-  Transitional Beds (Qtb)
-  Modified Land



1 inch = 600 feet

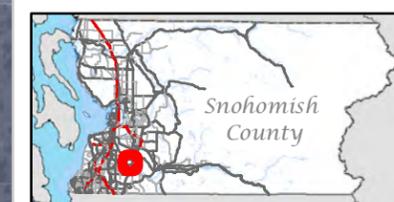
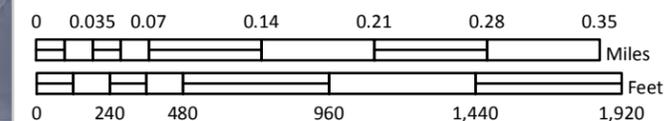


Figure 5

Cathcart Landfill Monitoring Network



Map Features

- Parcel Boundary
- Subject Property Boundary

Aquifer Unit (Active Wells)

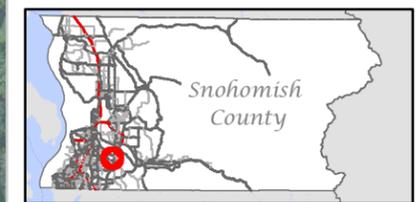
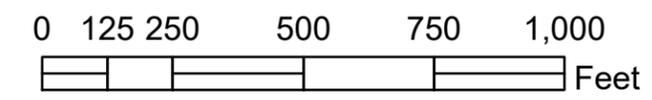
- Deep Aquifer
- Shallow Aquifer

Inactive / Removed Wells

- Abandoned / Decommissioned
- Inactive

Additional Sampling Points

- Gas Probe
- Surface Water Sample Locations

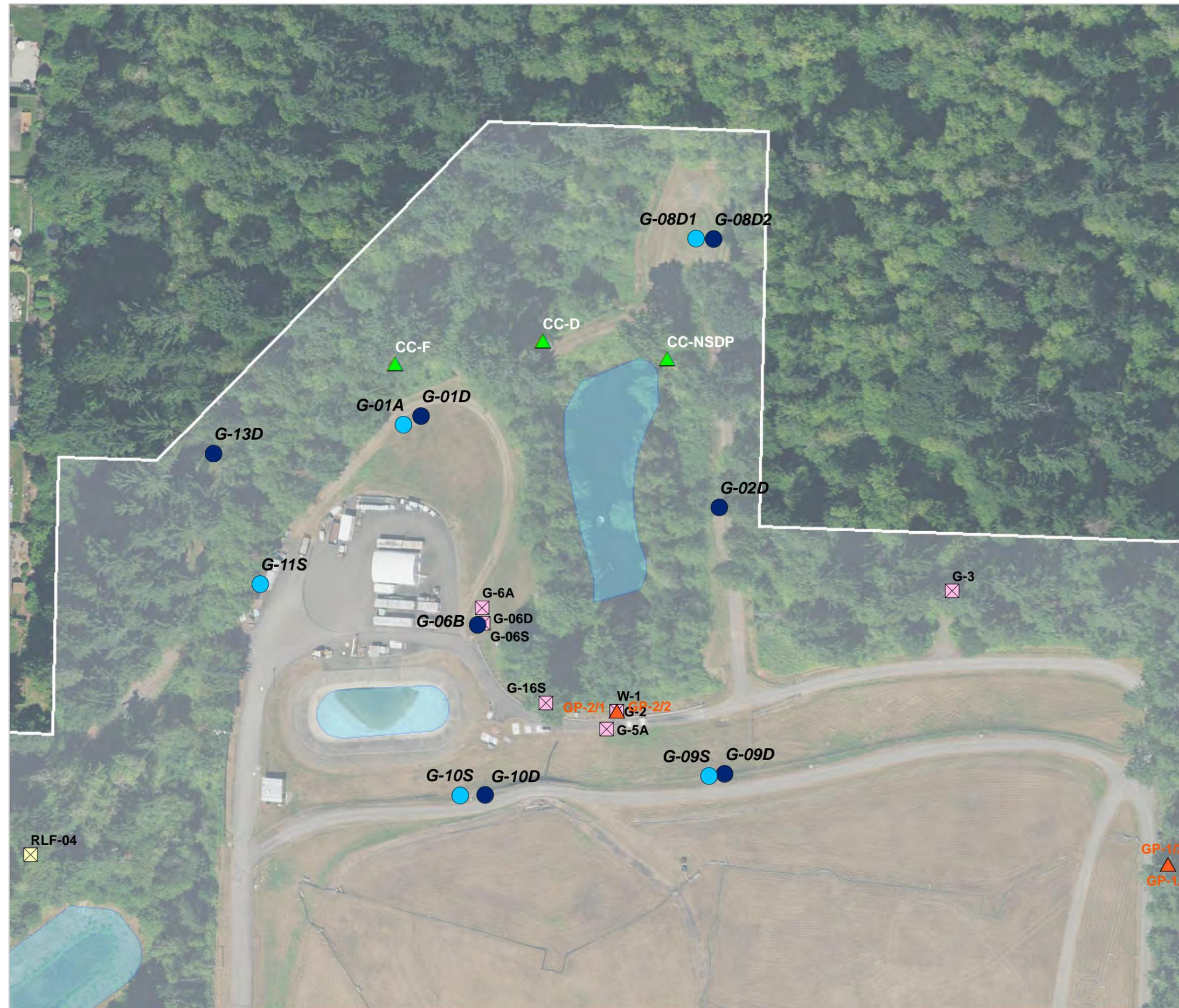


Snohomish County
Public Works
Solid Waste Division
November 12, 2019

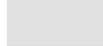
All maps, data, and information set forth herein ("Data"), are for illustrative purposes only and are not to be considered an official citation to, or representation of, the Snohomish County Code. Amendments and updates to the Data, together with other applicable County Code provisions, may apply which are not depicted herein. Snohomish County makes no representation or warranty concerning the content, accuracy, currency, completeness or quality of the Data contained herein and expressly disclaims any warranty of merchantability or fitness for any particular purpose. All persons accessing or otherwise using this Data assume all responsibility for use thereof and agree to hold Snohomish County harmless from and against any damages, loss, claim or liability arising out of any error, defect or omission contained within said Data. Washington State Law, Ch. 42.56 RCW, prohibits state and local agencies from providing access to lists of individuals intended for use for commercial purposes and, thus, no commercial use may be made of any Data comprising lists of individuals contained herein.

Figure 5a

Cathcart Landfill Monitoring Network



Map Features

-  Parcel Boundary
-  Subject Property Boundary

Aquifer Unit (Active Wells)

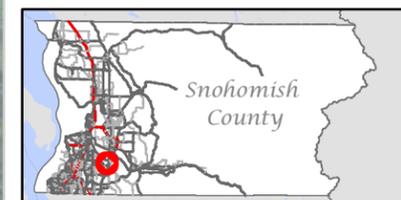
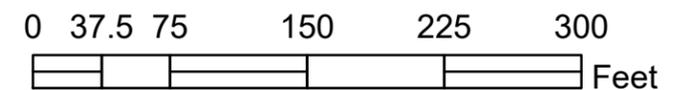
-  Deep Aquifer
-  Shallow Aquifer

Inactive / Removed Wells

-  Abandoned / Decommissioned
-  Inactive

Additional Sampling Points

-  Gas Probe
-  Water Sample Locations



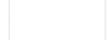
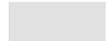
All maps, data, and information set forth herein ("Data"), are for illustrative purposes only and are not to be considered an official citation to, or representation of, the Snohomish County Code. Amendments and updates to the Data, together with other applicable County Code provisions, may apply which are not depicted herein. Snohomish County makes no representation or warranty concerning the content, accuracy, currency, completeness or quality of the Data contained herein and expressly disclaims any warranty of merchantability or fitness for any particular purpose. All persons accessing or otherwise using this Data assume all responsibility for use thereof and agree to hold Snohomish County harmless from and against any damages, loss, claim or liability arising out of any error, defect or omission contained within said Data. Washington State Law, Ch. 42.56 RCW, prohibits state and local agencies from providing access to lists of individuals intended for use for commercial purposes and, thus, no commercial use may be made of any Data comprising lists of individuals contained herein.

Figure 6a

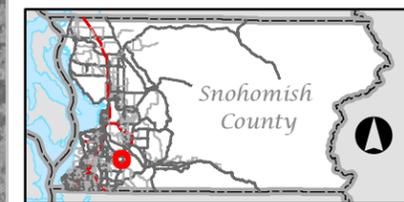
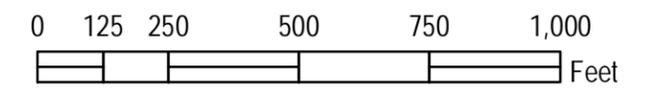
Cathcart Landfill

Shallow Aquifer Groundwater Elevation Contours Second Quarter 2019

 DIRECTION OF GROUNDWATER FLOW
 .00037 ft / day
 0.14 ft / year
 125.69 degrees to the positive x - axis

-  PARCEL BOUNDARY
-  SUBJECT PROPERTY BOUNDARY
-  5 FT CONTOUR
-  WELL LOCATION

WELL_ID	SAMP_DATE	MEAS_HEAD
G-01A	4/23/2019	220.23
G-04A	4/24/2019	272.20
G-08D1	4/25/2019	199.81
G-09S	4/26/2019	243.35
G-10S	4/27/2019	244.12
G-11S	4/28/2019	232.23
G-14S	4/29/2019	319.46
G-24S	4/30/2019	307.75



All maps, data, and information set forth herein ("Data"), are for illustrative purposes only and are not to be considered an official citation to, or representation of, the Snohomish County Code. Amendments and updates to the Data, together with other applicable County Code provisions, may apply which are not depicted herein. Snohomish County makes no representation or warranty concerning the content, accuracy, currency, completeness or quality of the Data contained herein and expressly disclaims any warranty of merchantability or fitness for any particular purpose. All persons accessing or otherwise using this Data assume all responsibility for use thereof and agree to hold Snohomish County harmless from and against any damages, loss, claim or liability arising out of any error, defect or omission contained within said Data. Washington State Law, Ch. 42.56 RCW, prohibits state and local agencies from providing access to lists of individuals intended for use for commercial purposes and, thus, no commercial use may be made of any Data comprising lists of individuals contained herein.

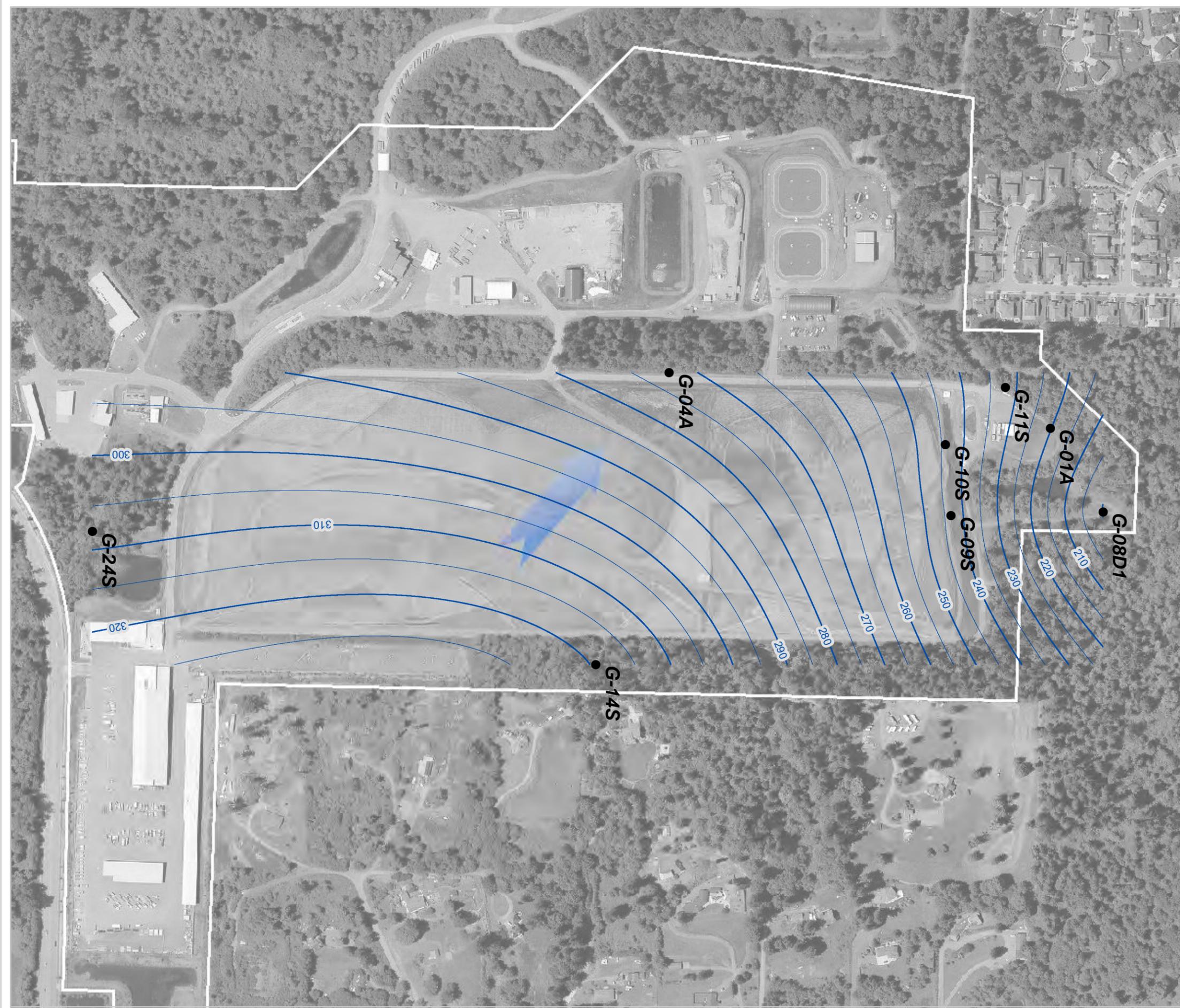
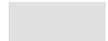


Figure 6b

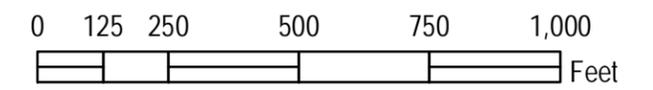
Cathcart Landfill

Deep Aquifer Groundwater Elevation Contours Second Quarter 2019

 DIRECTION OF GROUNDWATER FLOW
 .012 ft / day
 4.32 ft / year
 140.87 degrees to the positive x - axis

-  PARCEL BOUNDARY
-  SUBJECT PROPERTY BOUNDARY
-  5 FT CONTOUR
-  WELL LOCATION

WELL_ID	SAMP_DATE	MEAS_HEAD
G-01D	4/23/2019	205.87
G-02D	4/23/2019	214.91
G-06B	4/23/2019	211.89
G-08D2	4/23/2019	218.38
G-09D	4/23/2019	223.14
G-10D	4/23/2019	238.28
G-13D	4/23/2019	220.65
G-14D	4/23/2019	298.44
G-24D	4/23/2019	301.23



All maps, data, and information set forth herein ("Data"), are for illustrative purposes only and are not to be considered an official citation to, or representation of, the Snohomish County Code. Amendments and updates to the Data, together with other applicable County Code provisions, may apply which are not depicted herein. Snohomish County makes no representation or warranty concerning the content, accuracy, currency, completeness or quality of the Data contained herein and expressly disclaims any warranty of merchantability or fitness for any particular purpose. All persons accessing or otherwise using this Data assume all responsibility for use thereof and agree to hold Snohomish County harmless from and against any damages, loss, claim or liability arising out of any error, defect or omission contained within said Data. Washington State Law, Ch. 42.56 RCW, prohibits state and local agencies from providing access to lists of individuals intended for use for commercial purposes and, thus, no commercial use may be made of any Data comprising lists of individuals contained herein.

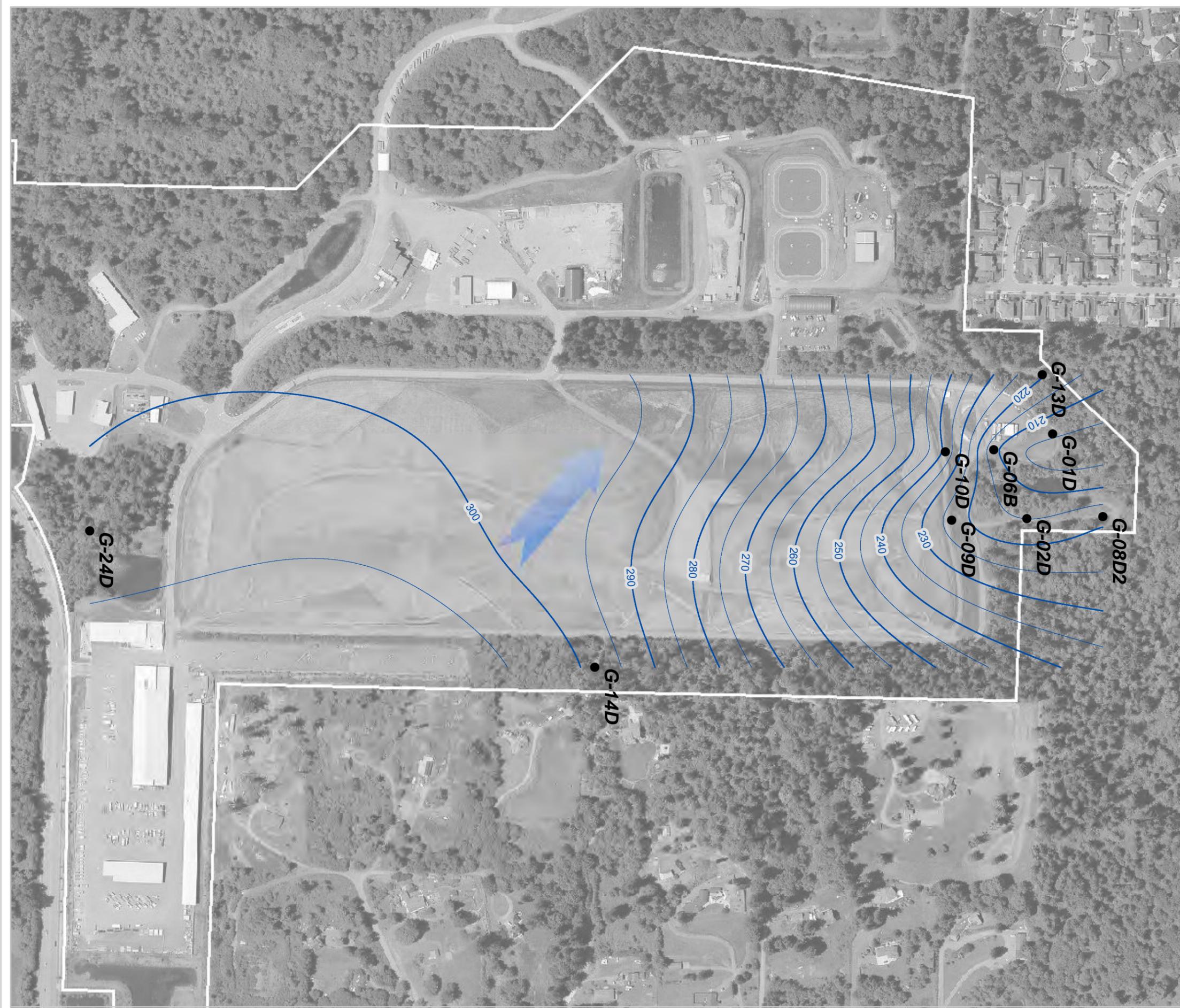
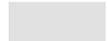


Figure 6c

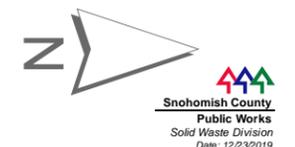
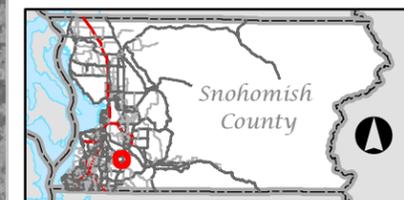
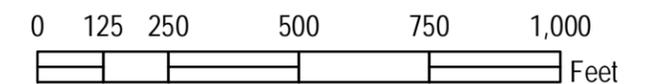
Cathcart Landfill

Shallow Aquifer Groundwater Elevation Contours Fourth Quarter 2019

 DIRECTION OF GROUNDWATER FLOW
 .00034 ft / day
 0.12 ft / year
 118.25 degrees to the positive x - axis

-  PARCEL BOUNDARY
-  SUBJECT PROPERTY BOUNDARY
-  5 FT CONTOUR
-  WELL LOCATION

WELL_ID	SAMP_DATE	MEAS_HEAD
G-01A	10/23/2019	220.79
G-04A	10/23/2019	272.96
G-08D1	10/23/2019	198.71
G-09S	10/23/2019	241.27
G-10S	10/23/2019	244.18
G-11S	10/23/2019	232.70
G-14S	10/23/2019	313.94
G-24S	10/23/2019	307.36



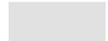
All maps, data, and information set forth herein ("Data"), are for illustrative purposes only and are not to be considered an official citation to, or representation of, the Snohomish County Code. Amendments and updates to the Data, together with other applicable County Code provisions, may apply which are not depicted herein. Snohomish County makes no representation or warranty concerning the content, accuracy, currency, completeness or quality of the Data contained herein and expressly disclaims any warranty of merchantability or fitness for any particular purpose. All persons accessing or otherwise using this Data assume all responsibility for use thereof and agree to hold Snohomish County harmless from and against any damages, loss, claim or liability arising out of any error, defect or omission contained within said Data. Washington State Law, Ch. 42.56 RCW, prohibits state and local agencies from providing access to lists of individuals intended for use for commercial purposes and, thus, no commercial use may be made of any Data comprising lists of individuals contained herein.

Figure 6d

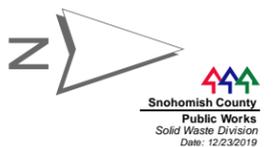
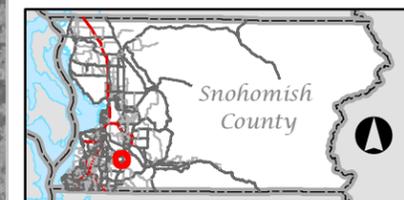
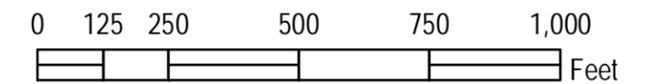
Cathcart Landfill

Deep Aquifer Groundwater Elevation Contours Fourth Quarter 2019

 DIRECTION OF GROUNDWATER FLOW
 .011 ft / day
 4.02 ft / year
 133.76 degrees to the positive x - axis

-  PARCEL BOUNDARY
-  SUBJECT PROPERTY BOUNDARY
-  5 FT CONTOUR
-  WELL LOCATION

WELL_ID	SAMP_DATE	MEAS_HEAD
G-01D	10/23/2019	206.29
G-02D	10/23/2019	210.50
G-06B	10/23/2019	212.02
G-08D2	10/23/2019	213.64
G-09D	10/23/2019	221.10
G-10D	10/23/2019	237.83
G-13D	10/23/2019	221.37
G-14D	10/23/2019	298.14
G-24D	10/23/2019	302.30



All maps, data, and information set forth herein ("Data"), are for illustrative purposes only and are not to be considered an official citation to, or representation of, the Snohomish County Code. Amendments and updates to the Data, together with other applicable County Code provisions, may apply which are not depicted herein. Snohomish County makes no representation or warranty concerning the content, accuracy, currency, completeness or quality of the Data contained herein and expressly disclaims any warranty of merchantability or fitness for any particular purpose. All persons accessing or otherwise using this Data assume all responsibility for use thereof and agree to hold Snohomish County harmless from and against any damages, loss, claim or liability arising out of any error, defect or omission contained within said Data. Washington State Law, Ch. 42.56 RCW, prohibits state and local agencies from providing access to lists of individuals intended for use for commercial purposes and, thus, no commercial use may be made of any Data comprising lists of individuals contained herein.

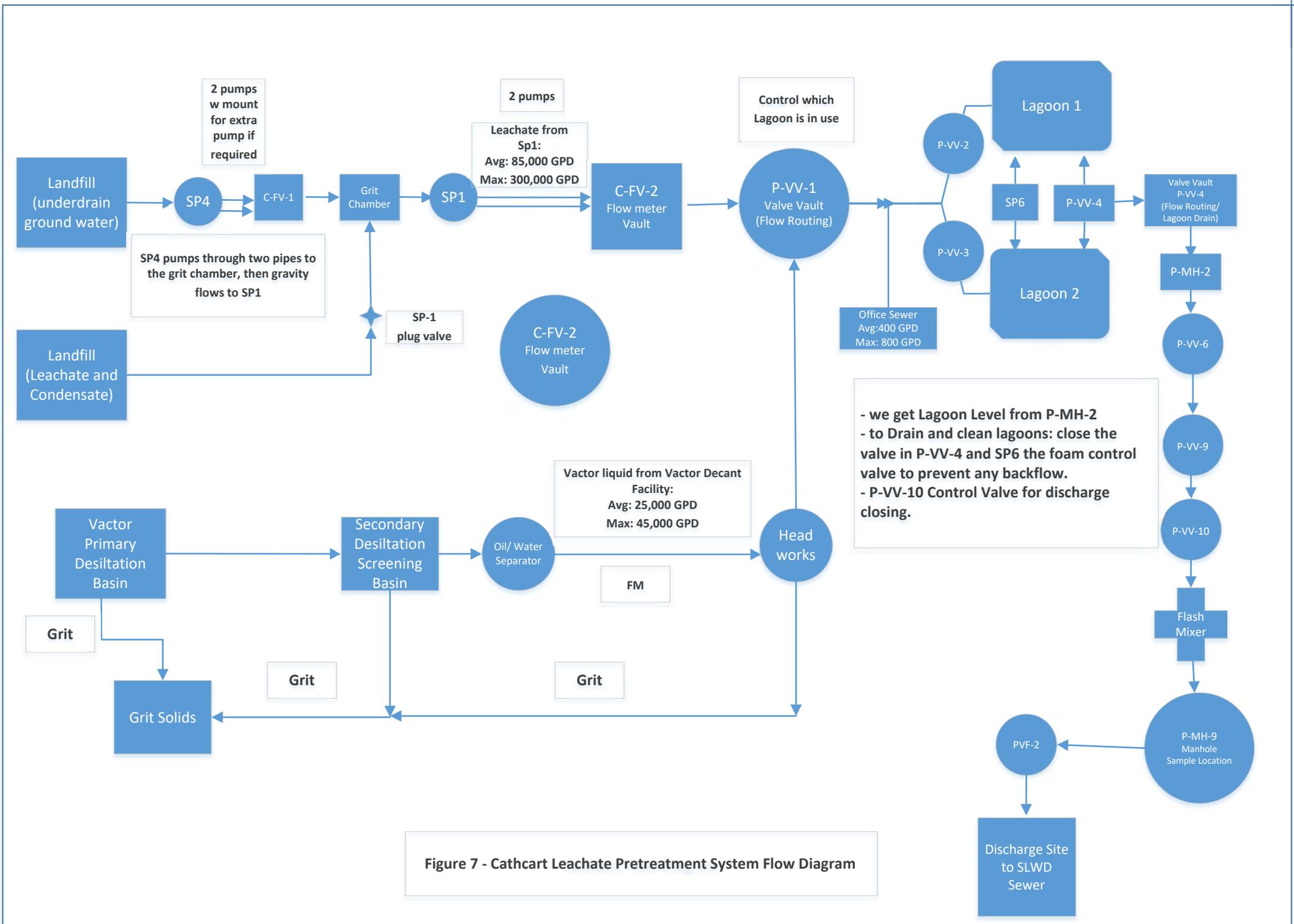


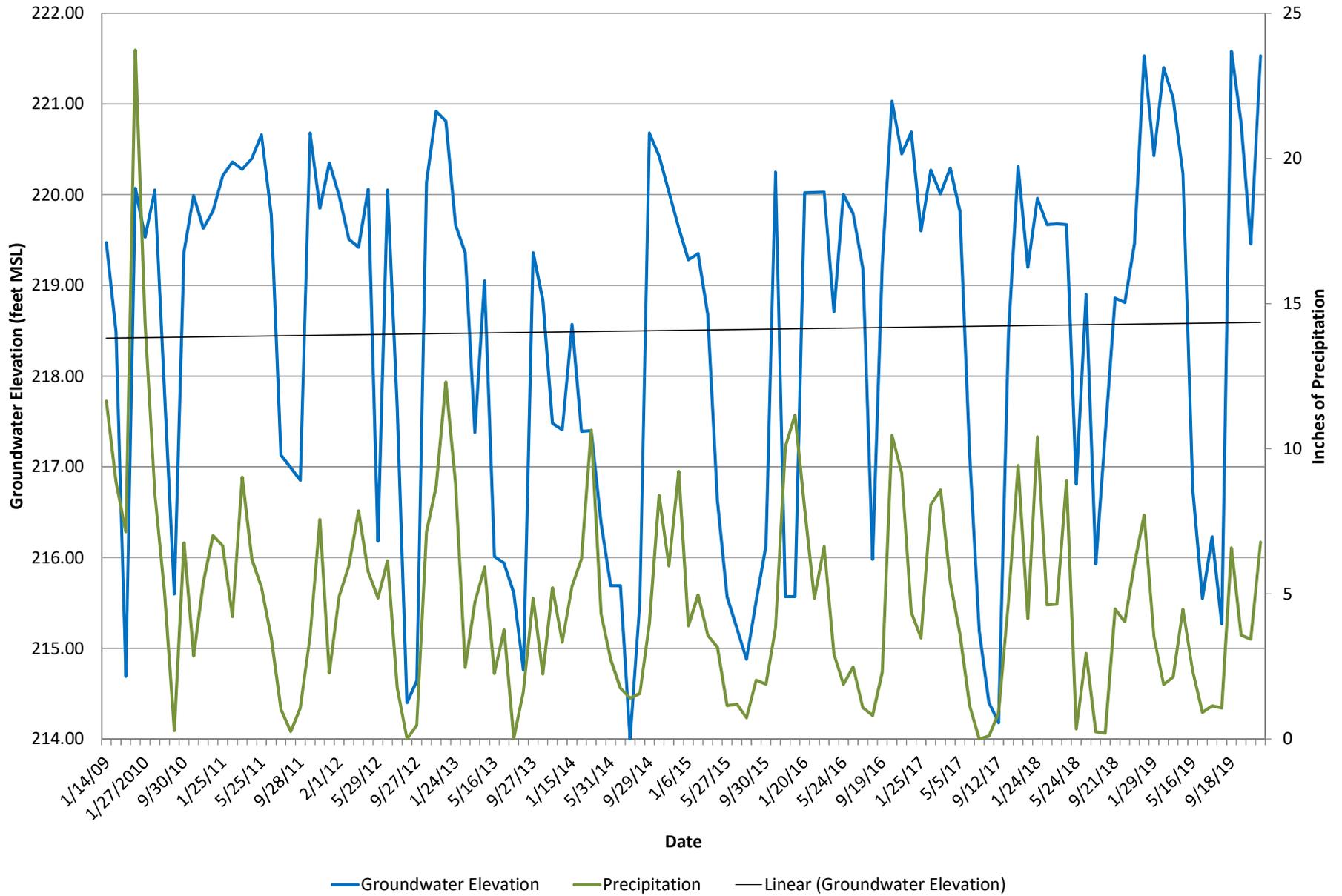
Figure 7 - Cathcart Leachate Pretreatment System Flow Diagram

Appendix A

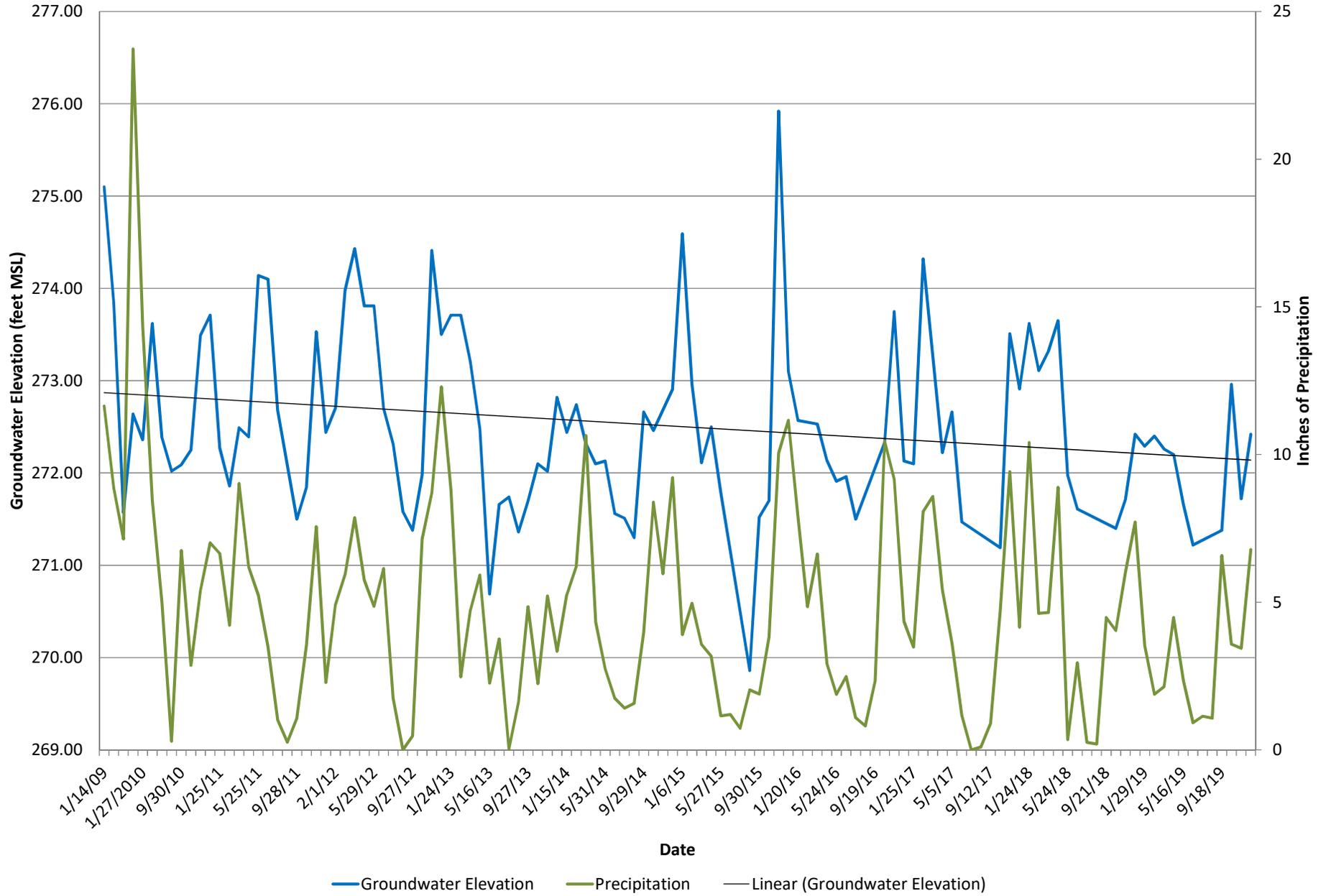
Hydrographs

Shallow Wells

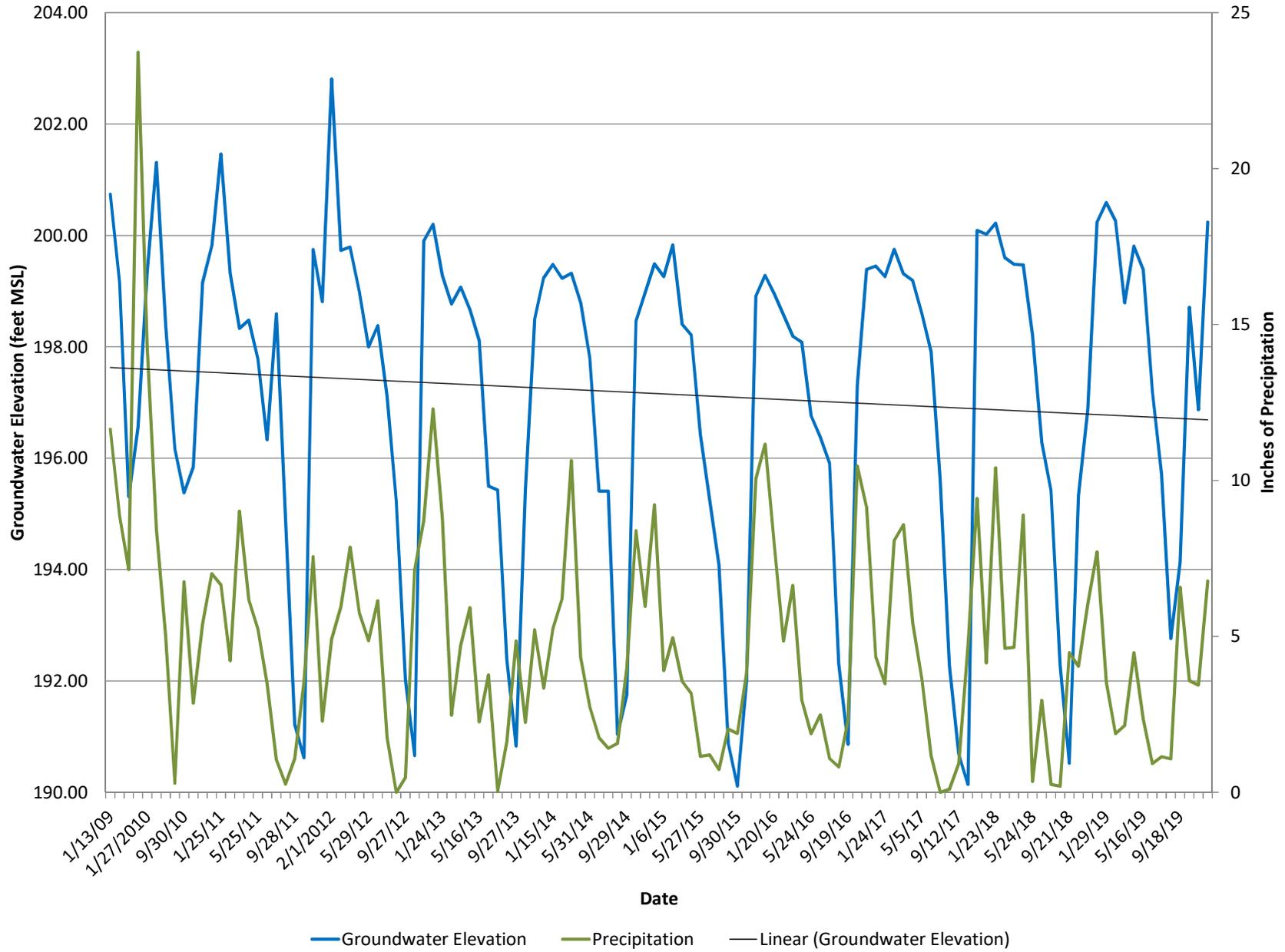
Hydrograph
Cathcart Landfill Shallow Aquifer
Well G-01A



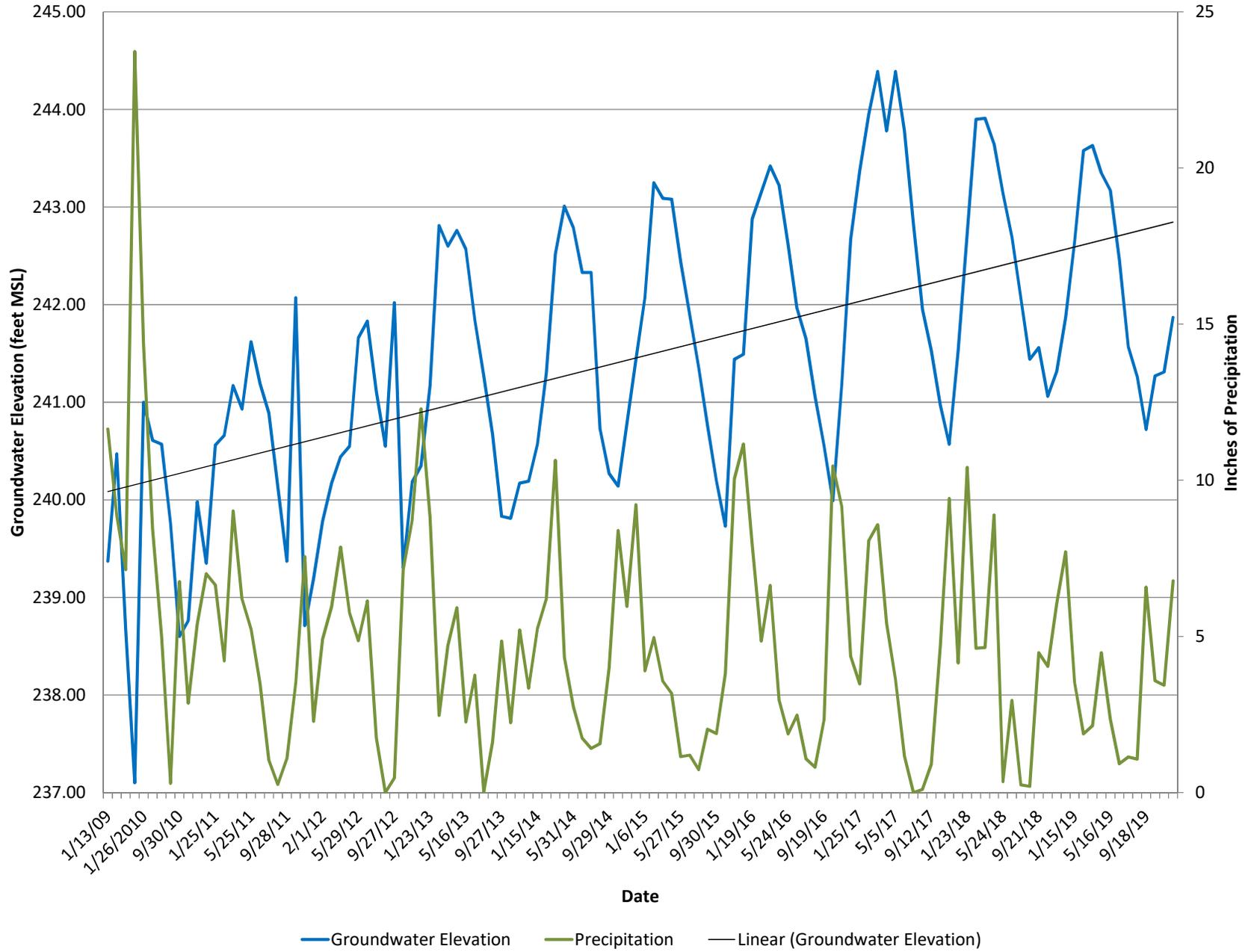
Hydrograph
Cathcart Landfill Shallow Aquifer
Well G-04A



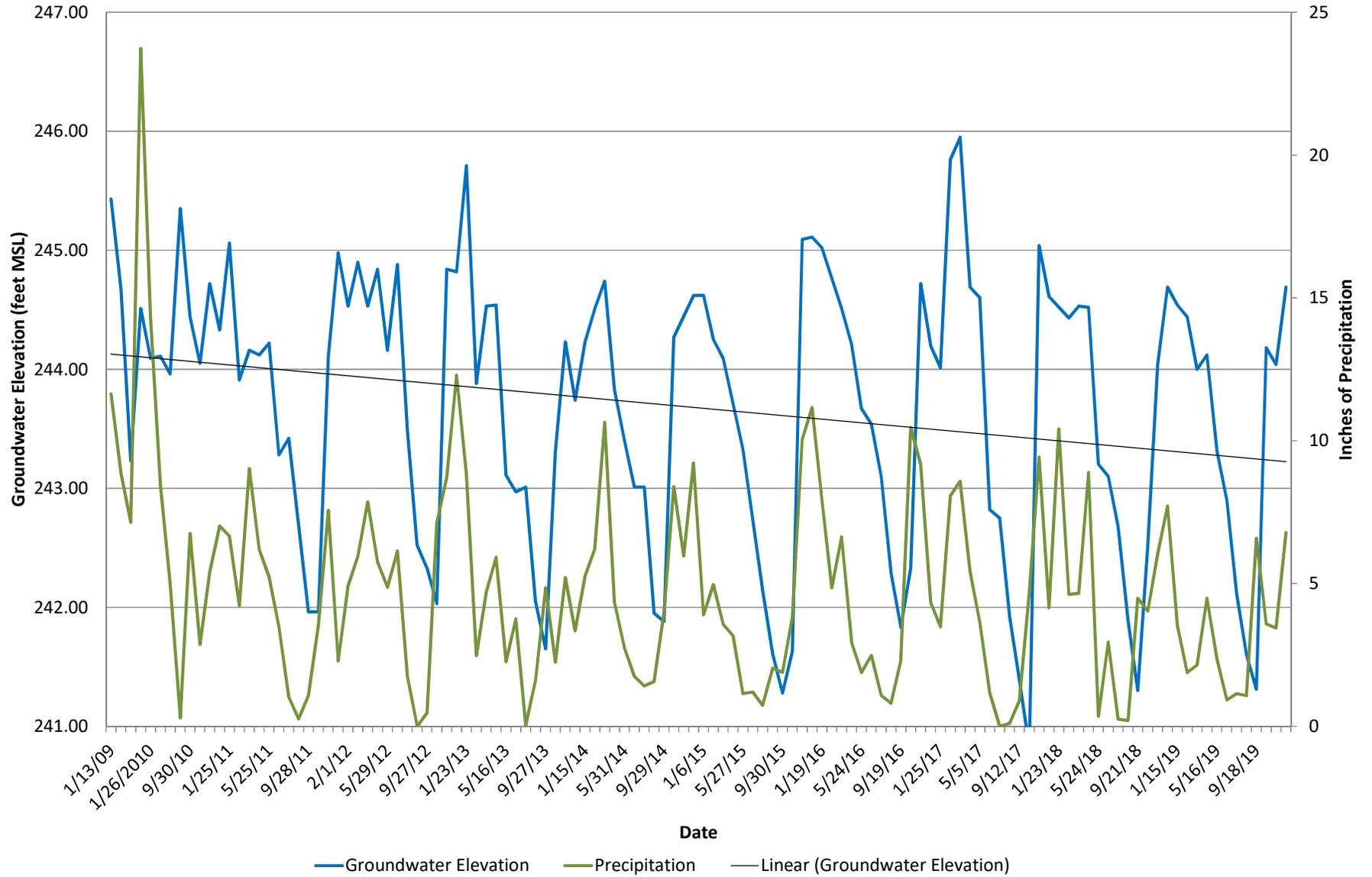
Hydrograph
Cathcart Landfill Shallow Aquifer
Well G-08D1



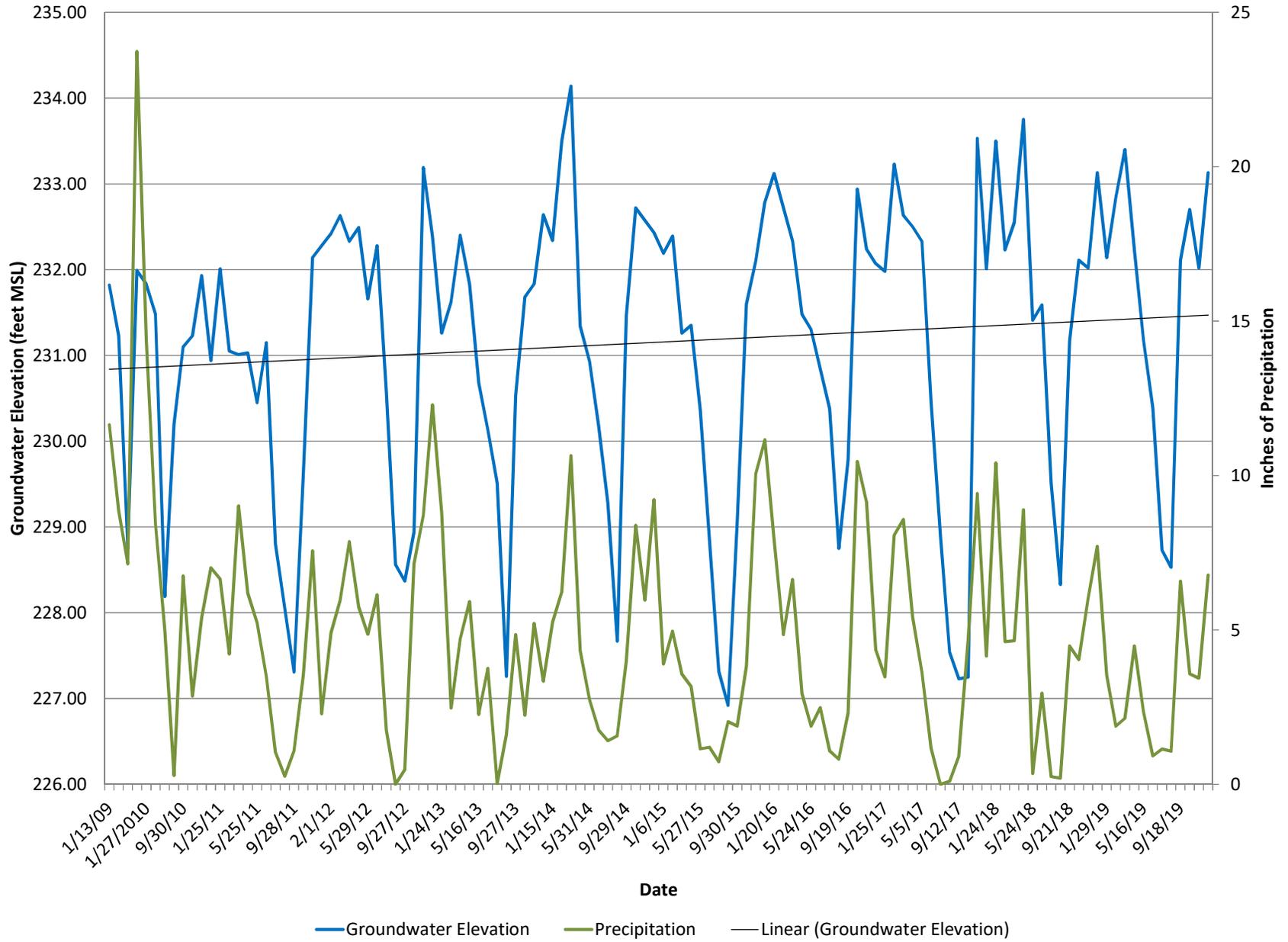
Hydrograph
Cathcart Landfill Shallow Aquifer
Well G-09S



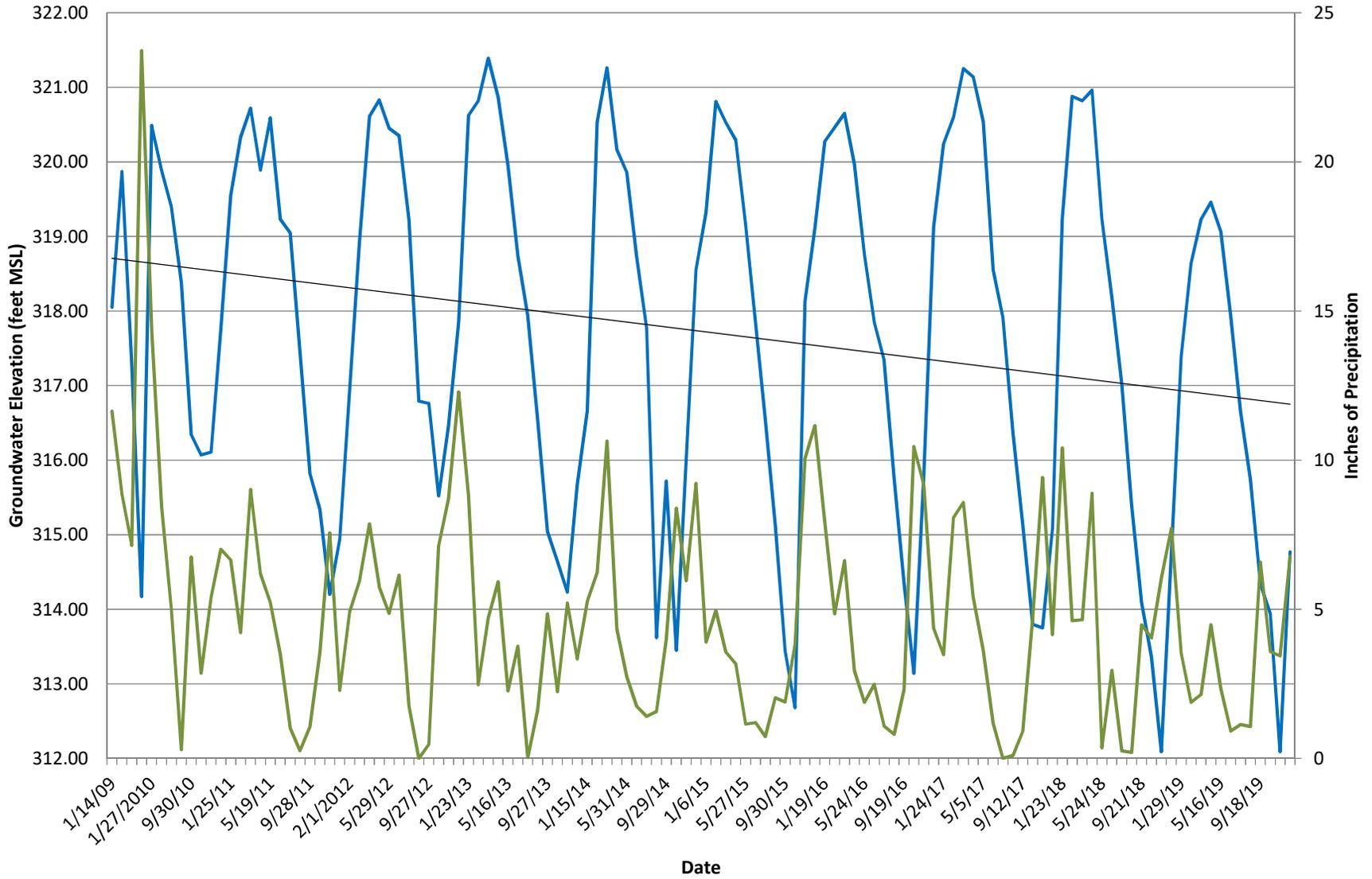
Hydrograph
Cathcart Landfill Shallow Aquifer
Well G-10S



Hydrograph
Cathcart Landfill Shallow Aquifer
Well G-11S

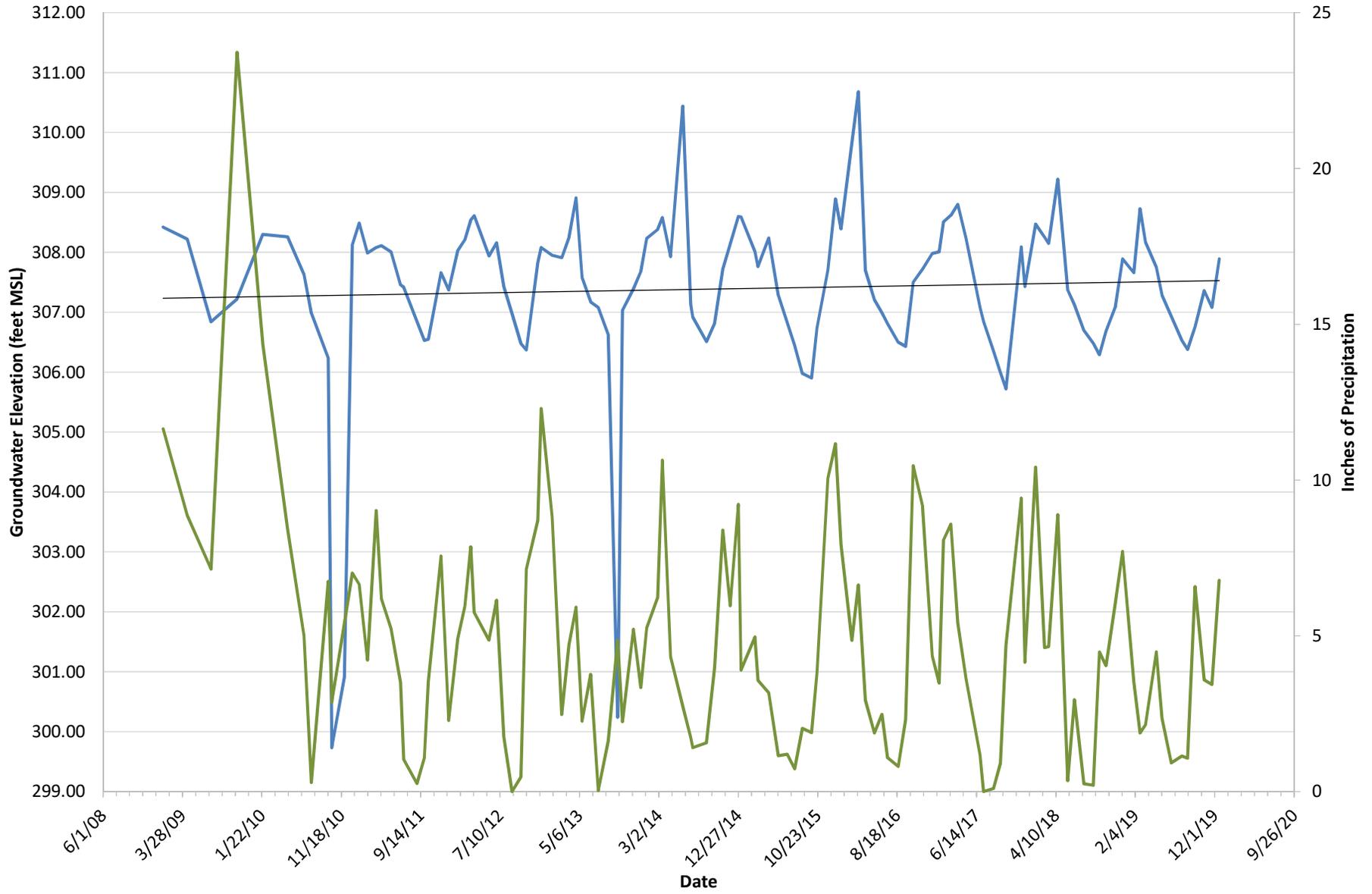


Hydrograph
Cathcart Landfill Shallow Aquifer
Well G-14S



— Groundwater Elevation — Precipitation — Linear (Groundwater Elevation)

Hydrograph
Cathcart Landfill Shallow Aquifer
Well G-24S



— Groundwater Elevation — Precipitation — Linear (Groundwater Elevation)



Snohomish County Solid Waste

Environmental Services Section

8915 Cathcart Way

Snohomish, WA 98296

Tel: (360) 668-7652

GROUND WATER ELEVATIONS

Cathcart

Location	Aquifer	Date	MSL Water Elev (Ft)
G-09S	S	1/15/2019	242.64
G-10S	S	1/15/2019	244.54



Snohomish County Solid Waste

Environmental Services Section

8915 Cathcart Way

Snohomish, WA 98296

Tel: (360) 668-7652

GROUND WATER ELEVATIONS

Cathcart

Location	Aquifer	Date	MSL Water Elev (Ft)
G-01A	S	4/24/2019	220.23
G-04A	S	4/24/2019	272.20
G-08D1	S	4/23/2019	199.81
G-09S	S	4/23/2019	243.35
G-10S	S	4/23/2019	244.12
G-11S	S	4/24/2019	232.23
G-14S	S	4/23/2019	319.46
G-24S	S	4/24/2019	307.75

Site: **Cathcart Landfill - Shallow Aquifer**

Measurement Date: **4/23/2019**

Well ID	[X] matrix		GW Elev.	[D] matrix		Pt														
	X-axis	Y-axis		D																
G-01A	413.12	3968.37	220.23	1																
G-04A	213.73	2603.52	272.20	1		413.12	213.73	710.11	723.5		470.79	267.7	1256	778.2						
G-08D1	710.11	4157.06	199.81	1		3968.37	2603.52	4157.06	3613		3595.13	3807	2341	538.9						
G-09S	723.45	3612.73	243.35	1		220.23	272.2	199.81	243.4		244.12	232.2	319.5	307.8						
G-10S	470.79	3595.13	244.12	1																
G-11S	267.66	3807.05	232.23	1																
G-14S	1256.30	2341.04	319.46	1																
G-24S	778.15	538.89	307.75	1																
9	0	0	0	1																
10	0	0	0	1																
11	0	0	0	1																
12	0	0	0	1																
13	0	0	0	1																
14	0	0	0	1																
15	0	0	0	1																
16	0	0	0	1																
17	0	0	0	1																
18	0	0	0	1																
19	0	0	0	1																
20	0	0	0	1																

{[P]t[P]}

{[P]t[P]}'

{[P]t[P]}'[P]t

{[P]t[P]}'[P]t [D] = [A] matrix

- A -6.4394E-05
- B 8.96472E-05
- C 0.002982726

Groundwater Gradient:	0.0370	
Conductivity (ft/day):	0.001	
Effective porosity:	10%	
GW velocity:	0.00037	ft/day
	0.14	ft/year
Flow direction:	125.69	degrees from the positive x-axis

This spreadsheet is from the paper, "A Spreadsheet Method For Estimating Hydraulic Gradient With Heads From Multiple Wells" submitted to Ground Water, March, 2002. To use the program, enter the coordinates for the well locations in the columns labeled x and y (part of the [X] matrix), and the water levels in the z column. The matrices are automatically updated and the gradient magnitude and direction are calculated in cell H30 and H35.



Snohomish County Solid Waste

Environmental Services Section

8915 Cathcart Way

Snohomish, WA 98296

Tel: (360) 668-7652

GROUND WATER ELEVATIONS

Cathcart

Location	Aquifer	Date	MSL Water Elev (Ft)
G-09S	S	7/30/2019	241.57
G-10S	S	7/30/2019	242.11



Snohomish County Solid Waste

Environmental Services Section

8915 Cathcart Way

Snohomish, WA 98296

Tel: (360) 668-7652

GROUND WATER ELEVATIONS

Cathcart

Location	Aquifer	Date	MSL Water Elev (Ft)
G-01A	S	10/23/2019	220.79
G-04A	S	10/22/2019	272.96
G-08D1	S	10/22/2019	198.71
G-09S	S	10/23/2019	241.27
G-10S	S	10/23/2019	244.18
G-11S	S	10/22/2019	232.70
G-14S	S	10/22/2019	313.94
G-24S	S	10/23/2019	307.36

Site: **Cathcart Landfill - Shallow Aquifer**

Measurement Date: **10/23/2019**

Well ID	[X] matrix		GW Elev.	[D] matrix	Pt														
	X-axis	Y-axis		D															
G-01A	413.12	3968.37	220.79	1															
G-04A	213.73	2603.52	272.96	1		413.12	213.73	710.11	723.5	470.79	267.7	1256	778.2						
G-08D1	710.11	4157.06	198.71	1		3968.37	2603.52	4157.06	3613	3595.13	3807	2341	538.9						
G-09S	723.45	3612.73	241.27	1		220.79	272.96	198.71	241.3	244.18	232.7	313.9	307.4						
G-10S	470.79	3595.13	244.18	1															
G-11S	267.66	3807.05	232.70	1	{{P}t{P}}														
G-14S	1256.30	2341.04	313.94	1		3721076.974	13833394.8	1276022											
G-24S	778.15	538.89	307.36	1		13833394.8	86048702.88	5948865											
9	0	0	0	1		1276022.235	5948864.698	527753.9											
10	0	0	0	1															
11	0	0	0	1	{{P}t{P}'														
12	0	0	0	1		1.61306E-06	4.671E-08	-4.4E-06											
13	0	0	0	1		4.671E-08	5.4004E-08	-7.2E-07											
14	0	0	0	1		-4.42664E-06	-7.2167E-07	2.07E-05											
15	0	0	0	1															
16	0	0	0	1	{{P}t{P}'}{P}t														
17	0	0	0	1		-0.000125606	-0.00074192	0.00046	3E-04	-0.000153554	-4E-04	7E-04	-8E-05						
18	0	0	0	1		7.42666E-05	-4.6404E-05	0.000114	5E-05	3.9924E-05	5E-05	-4E-05	-2E-04						
19	0	0	0	1		-0.000115083	0.002834129	-0.00202	-8E-04	0.000383921	9E-04	-7E-04	0.003						
20	0	0	0	1															

{{P}t{P}'}{P}t [D] = [A] matrix

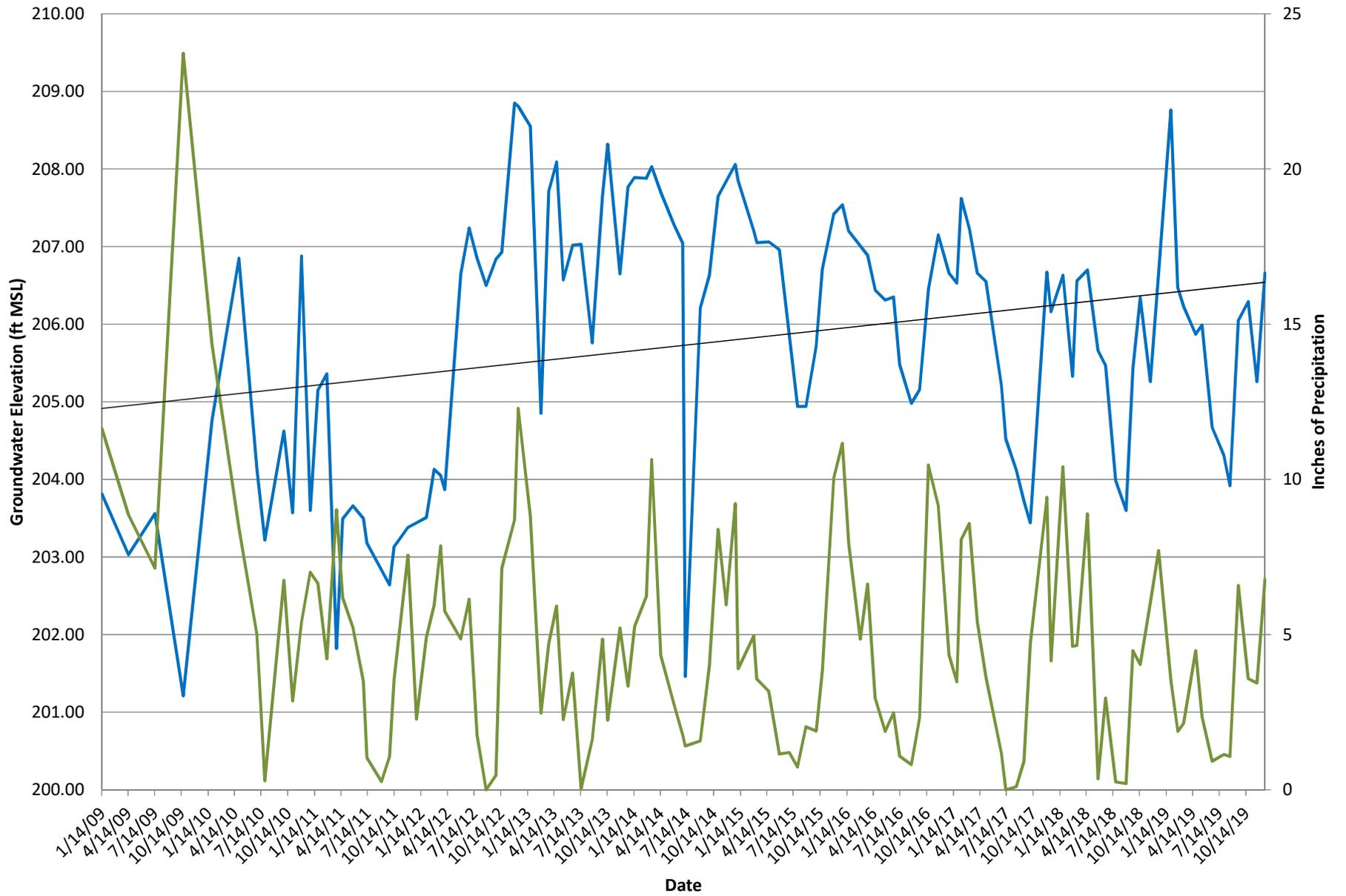
- A -4.792E-05
- B 8.91735E-05
- C 0.002960804

Groundwater Gradient:	0.0342
Conductivity (ft/day):	0.001
Effective porosity:	10%
GW velocity:	0.00034 ft/day
	0.12 ft/year
Flow direction:	118.25 degrees from the positive x-axis

This spreadsheet is from the paper, "A Spreadsheet Method For Estimating Hydraulic Gradient With Heads From Multiple Wells" submitted to Ground Water, March, 2002. To use the program, enter the coordinates for the well locations in the columns labeled x and y (part of the [X] matrix), and the water levels in the z column. The matrices are automatically updated and the gradient magnitude and direction are calculated in cell H30 and H35.

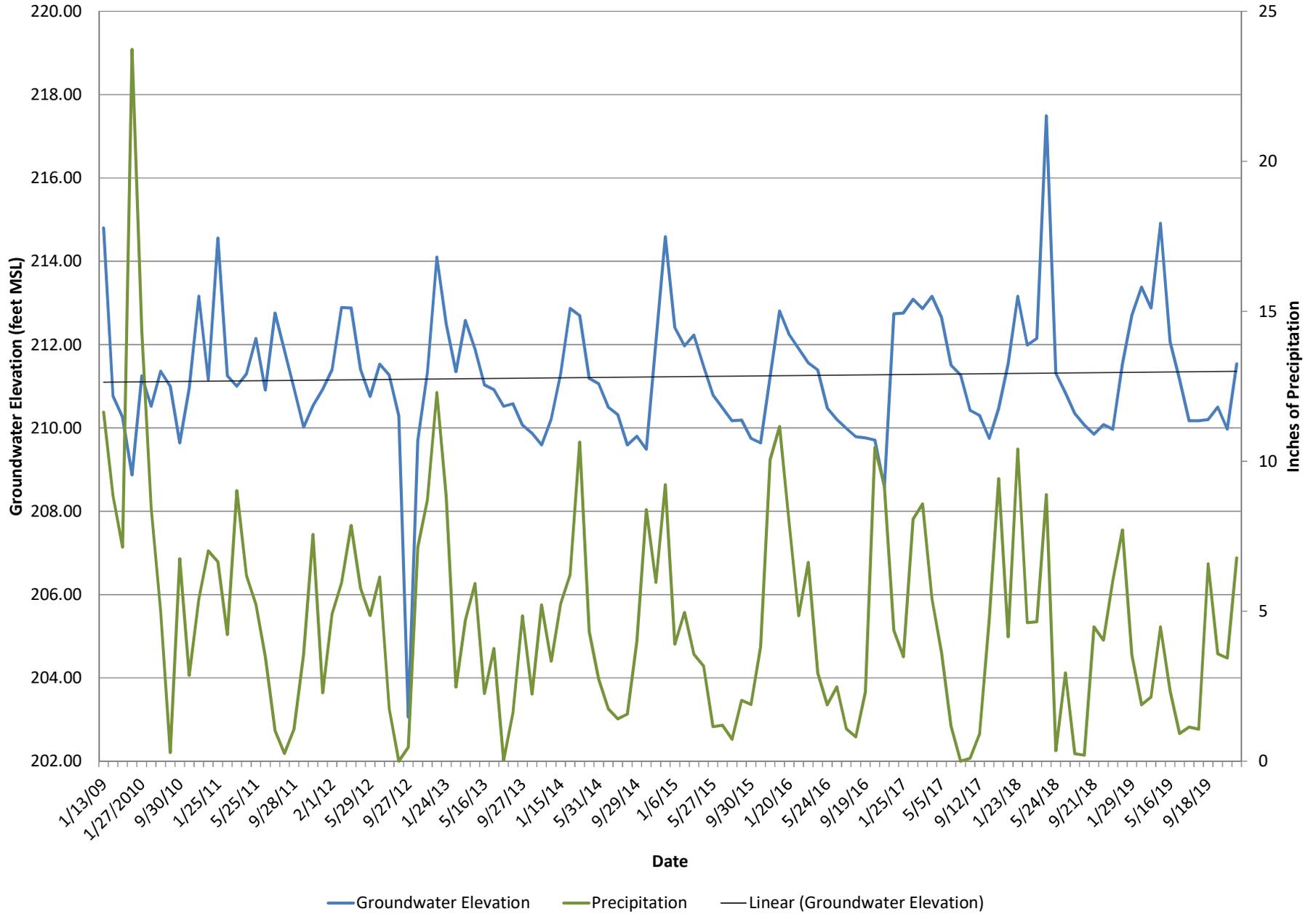
Deep Wells

Hydrograph
Cathcart Landfill Deep Aquifer
Well G-01D

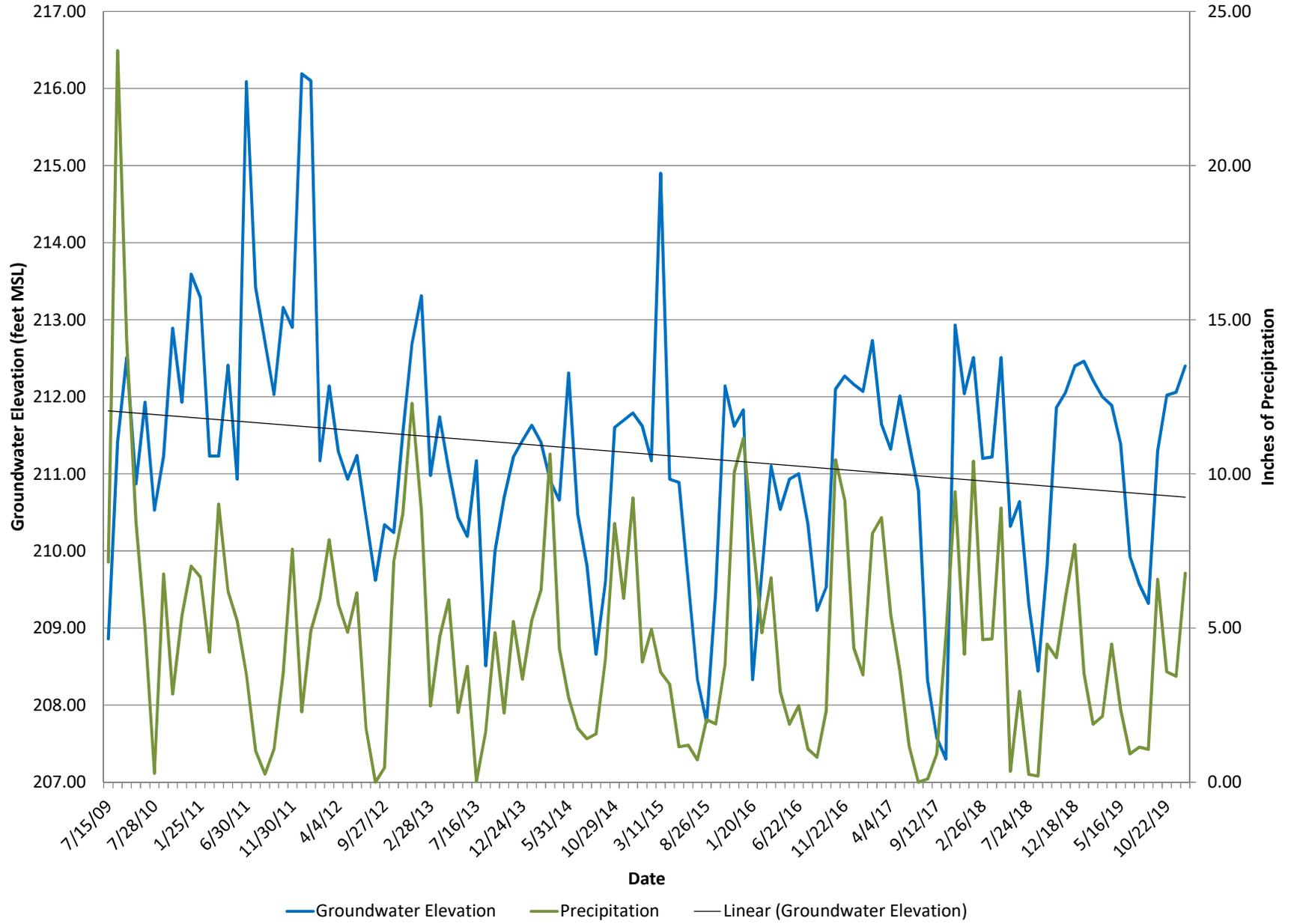


— Groundwater Elevation — Precipitation — Linear (Groundwater Elevation)

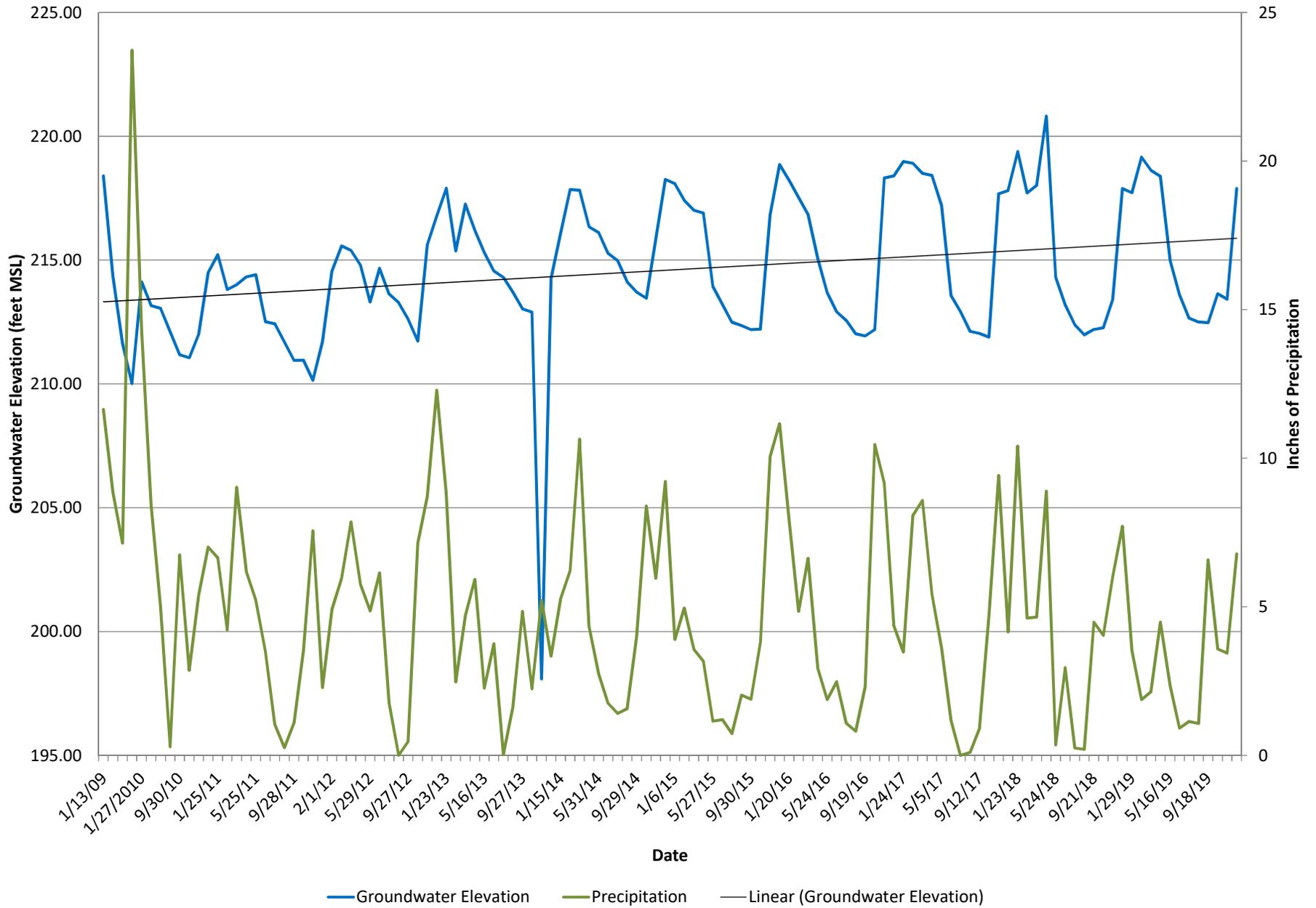
Hydrograph
Cathcart Landfill Deep Aquifer
Well G-02D



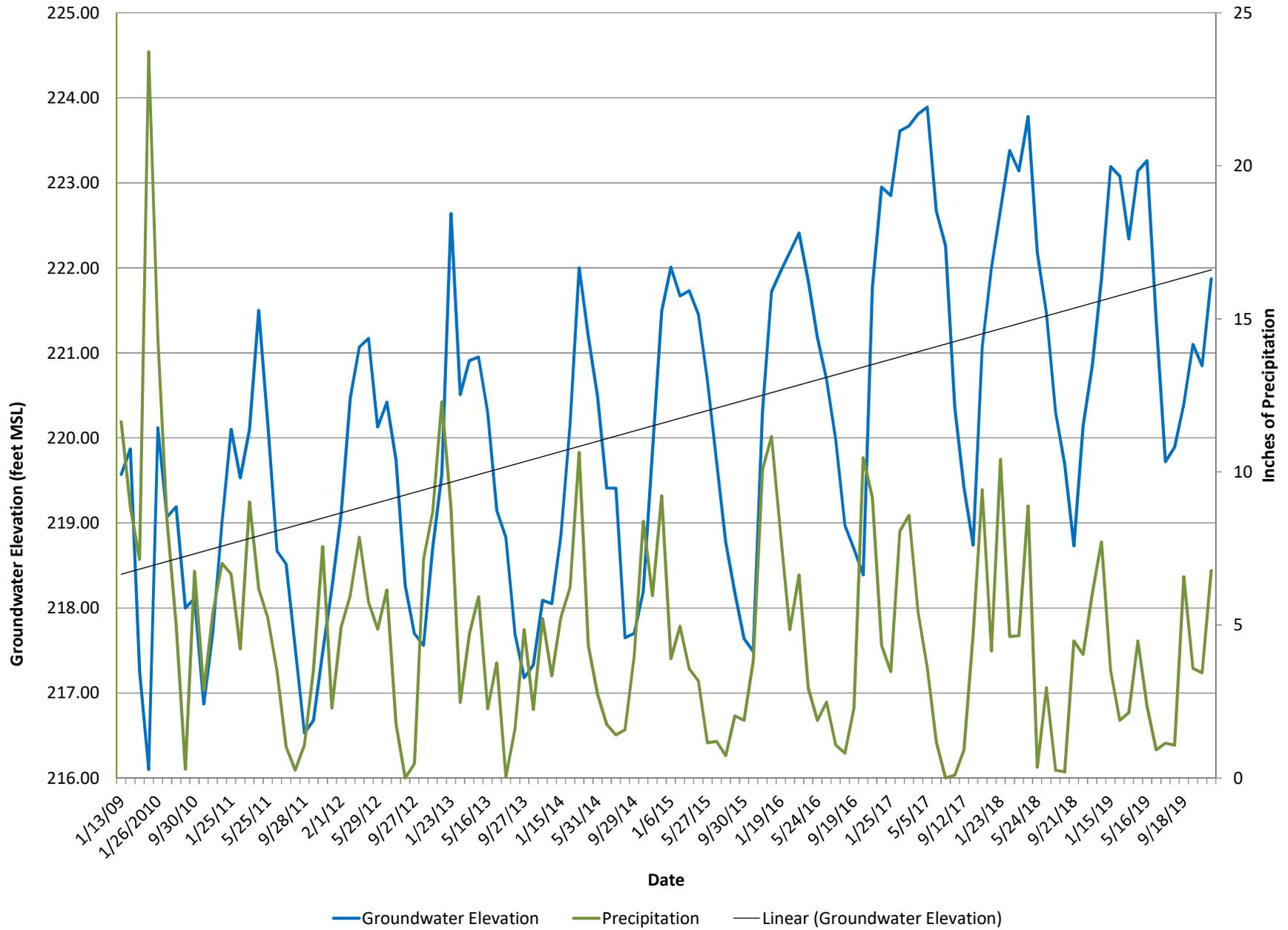
Hydrograph
Cathcart Landfill Deep Aquifer
Well G-06B



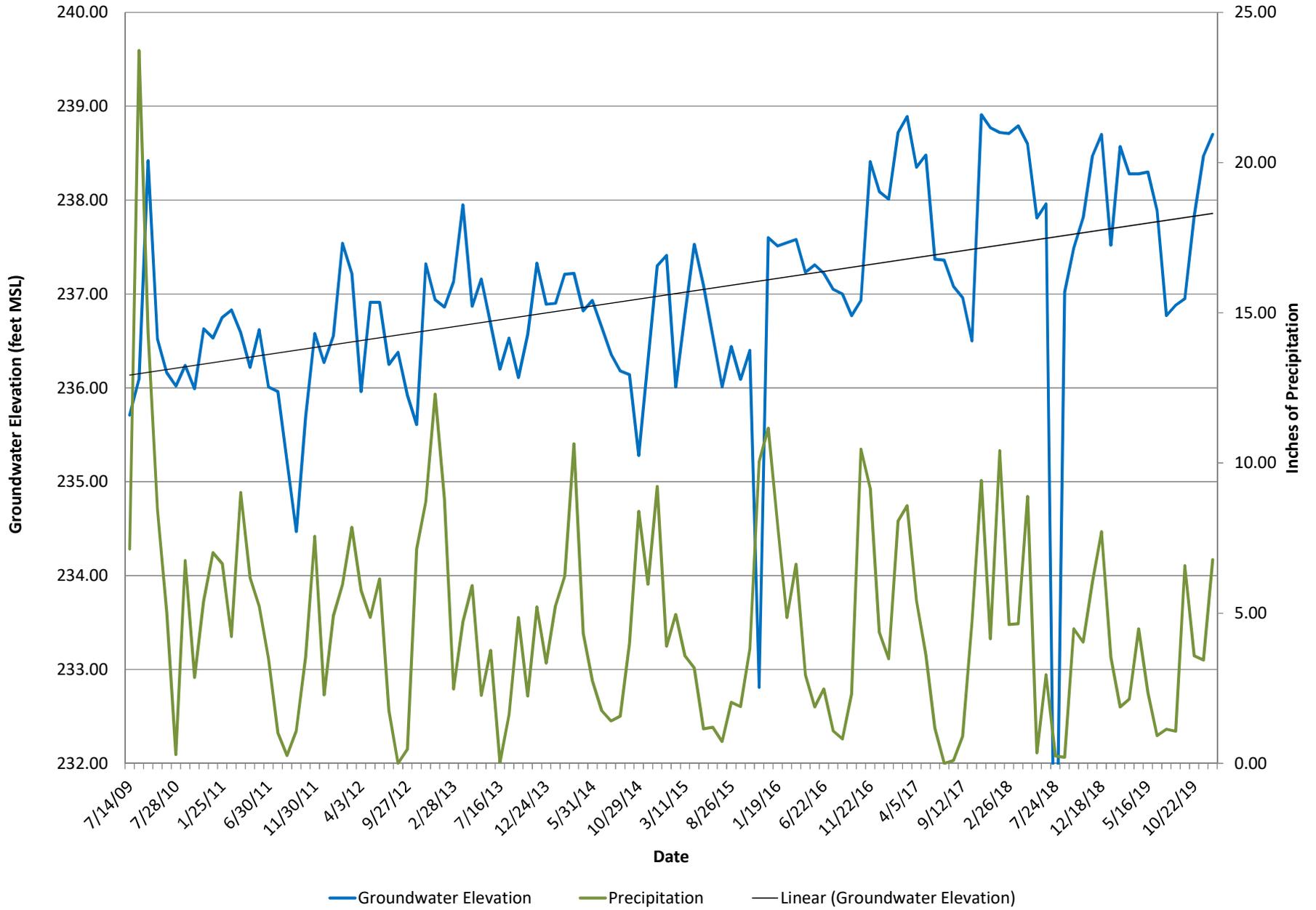
Hydrograph
Cathcart Landfill Deep Aquifer
Well G-08D2



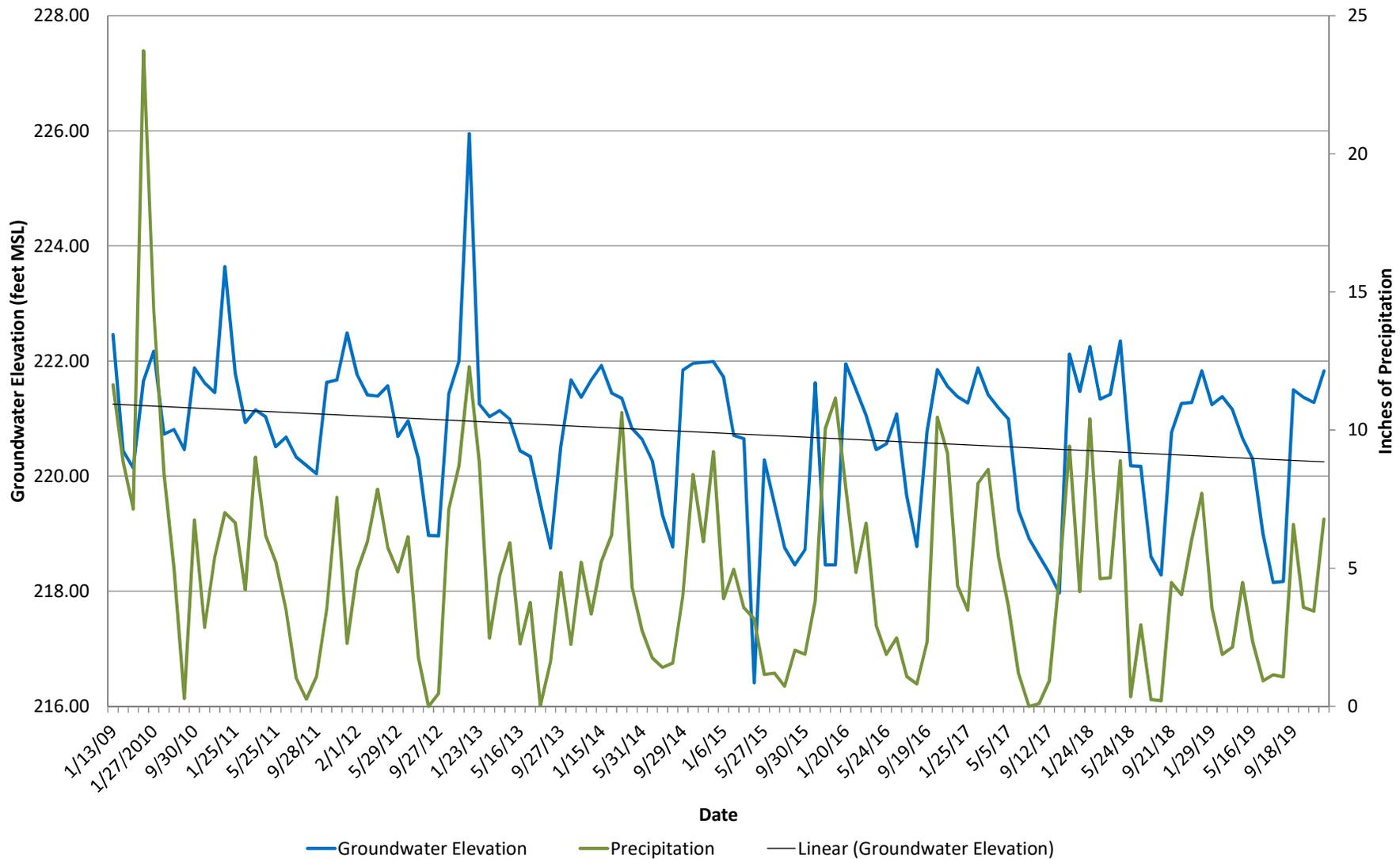
Hydrograph
Cathcart Landfill Deep Aquifer
Well G-09D



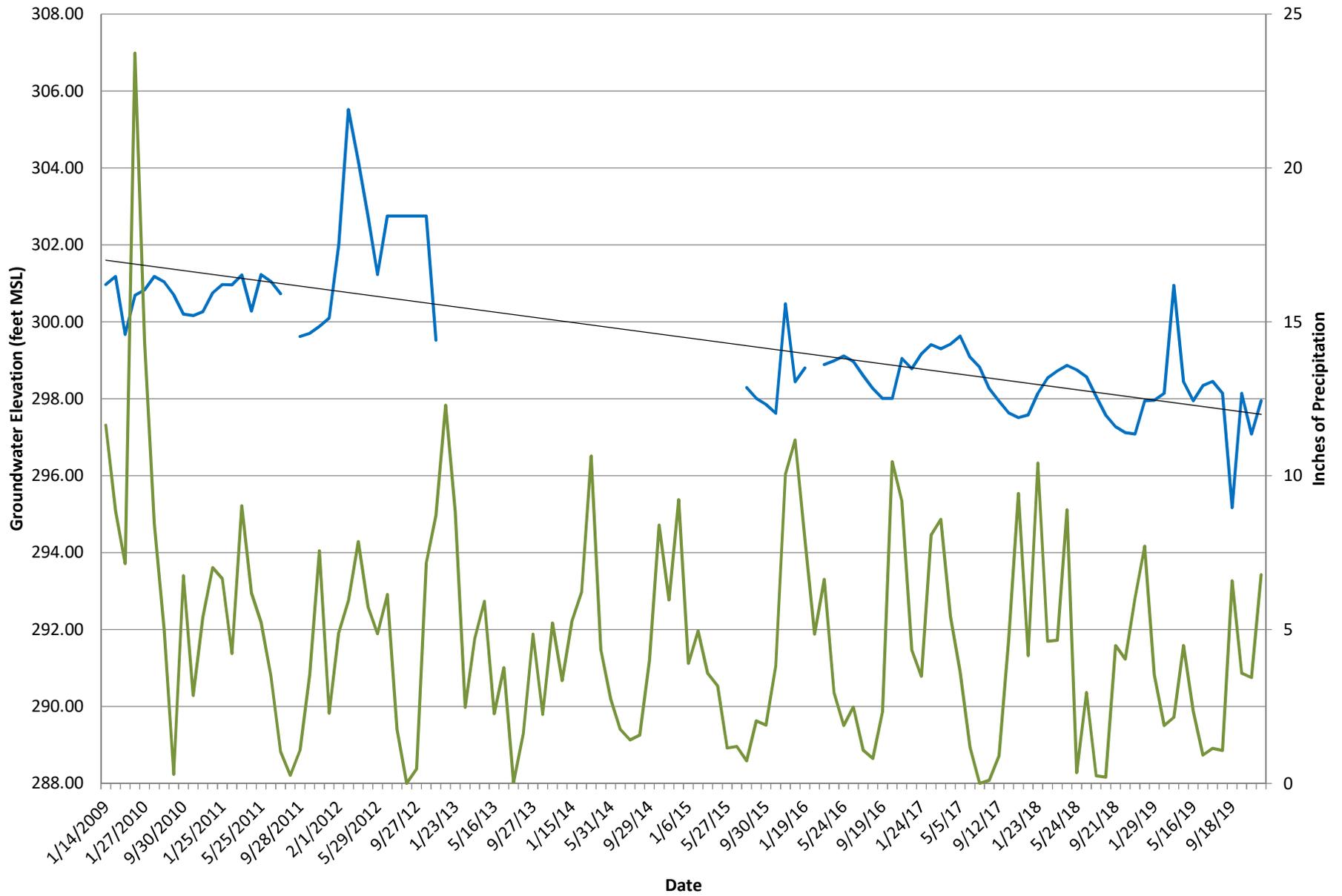
Hydrograph
Cathcart Landfill Deep Aquifer
Well G-10D



Hydrograph
Cathcart Landfill Deep Aquifer
Well G-13D

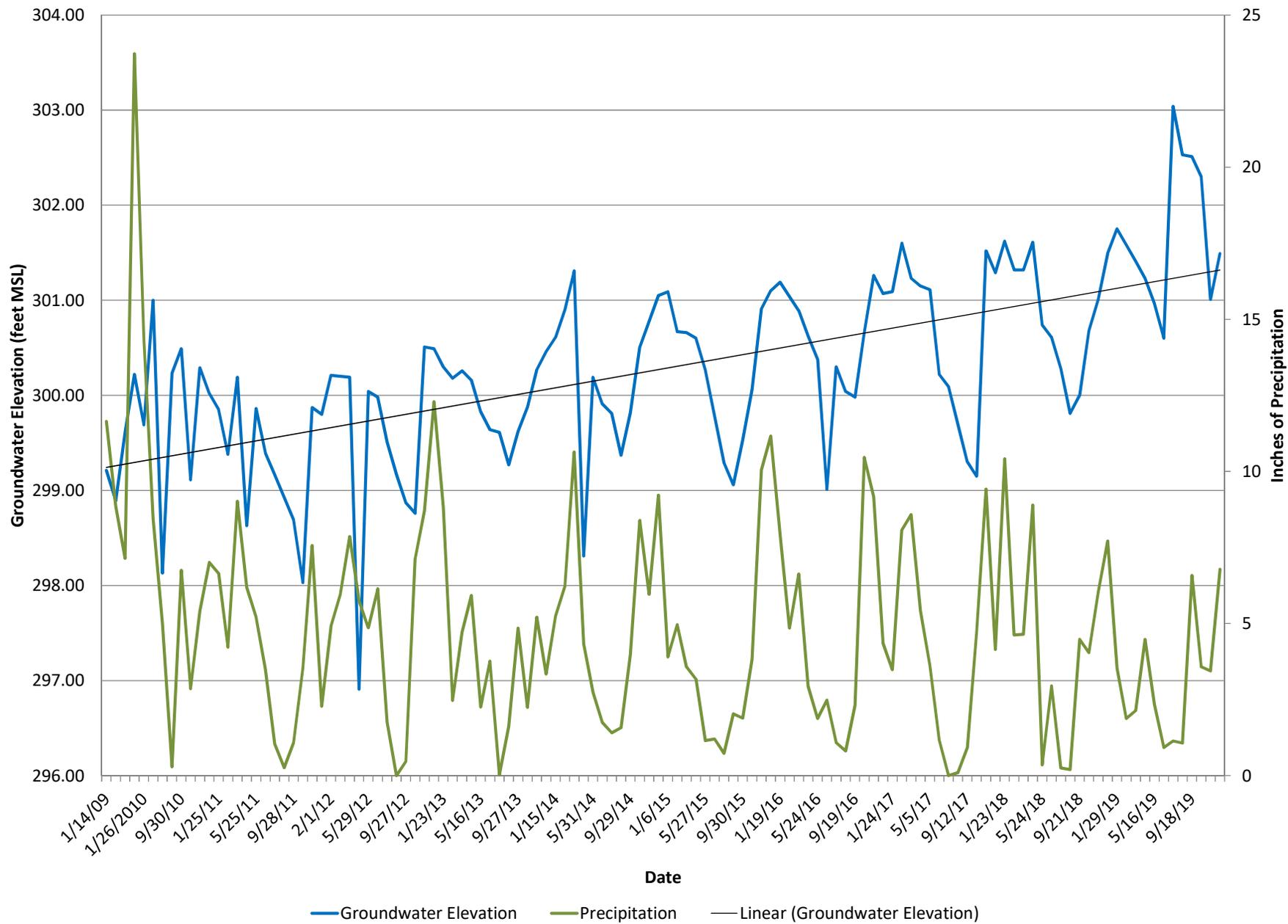


Hydrograph
Cathcart Landfill Deep Aquifer
Well G-14D



— Groundwater Elevation — Precipitation — Linear (Groundwater Elevation)

Hydrograph
Cathcart Landfill Deep Aquifer
Well G-24D





Snohomish County Solid Waste

Environmental Services Section

8915 Cathcart Way

Snohomish, WA 98296

Tel: (360) 668-7652

GROUND WATER ELEVATIONS

Cathcart

Location	Aquifer	Date	MSL Water Elev (Ft)
G-09D	D	1/15/2019	223.19
G-10D	D	1/15/2019	237.52



Snohomish County Solid Waste

Environmental Services Section

8915 Cathcart Way

Snohomish, WA 98296

Tel: (360) 668-7652

GROUND WATER ELEVATIONS

Cathcart

Location	Aquifer	Date	MSL Water Elev (Ft)
G-01D	D	4/24/2019	205.87
G-02D	D	4/23/2019	214.91
G-06B	D	4/24/2019	211.89
G-08D2	D	4/23/2019	218.38
G-09D	D	4/23/2019	223.14
G-10D	D	4/23/2019	238.28
G-13D	D	4/24/2019	220.65
G-14D	D	4/23/2019	298.44
G-24D	D	4/24/2019	301.23

Site: **Cathcart Landfill - Deep Aquifer**

Measurement Date: **4/23/2019**

Well ID	[X] matrix			[D] matrix	Pt															
	X-axis	Y-axis	GW Elev.	D																
G-01D	431.12	3977.30	205.87	1																
G-02D	733.79	3884.79	214.91	1		431.12	733.79	488.43	728.1	739.2	496	220.3	1266	781						
G-06B	488.43	3765.90	211.89	1		3977.3	3884.79	3765.9	4156	3614.85	3593	3939	2338	528.9						
G-08D2	728.12	4156.36	218.38	1		205.87	214.91	211.89	218.4	223.14	238.3	220.7	298.4	301.2						
G-09D	739.20	3614.85	223.14	1																
G-10D	495.97	3593.41	238.28	1	{[P]t{[P]}															
G-13D	220.31	3939.18	220.65	1		4546675.575	18125521.98	1453773												
G-14D	1266.00	2337.53	298.44	1		18125521.98	109608443.7	6748263												
G-24D	780.99	528.85	301.23	1		1453772.64	6748262.787	516217.1												
10	0	0	0	1																
11	0	0	0	1	{[P]t{[P]}															
12	0	0	0	1		2.40131E-06	9.86674E-08	-8.05E-06												
13	0	0	0	1		9.86674E-08	5.08015E-08	-9.42E-07												
14	0	0	0	1		-8.0524E-06	-9.41971E-07	3.69E-05												
15	0	0	0	1																
16	0	0	0	1	{[P]t{[P]}{[P]t															
17	0	0	0	1		-0.000230067	0.000414815	-0.000162	4E-04	0.000334901	-4E-04	-9E-04	9E-04	-5E-04						
18	0	0	0	1		5.06666E-05	6.73152E-05	3.99E-05	8E-05	4.63832E-05	7E-06	1E-05	-4E-05	-2E-04						
19	0	0	0	1		0.000384379	-0.001631868	0.000344	-0.002	-0.001117235	0.001	0.003	-0.001	0.004						
20	0	0	0	1																

{[P]t{[P]}{[P]t [D] = [A] matrix

- A -0.000104852
- B 8.53164E-05
- C 0.003311559

Groundwater Gradient:	0.0408	
Conductivity (ft/day):	0.029	
Effective porosity:	10%	
GW velocity:	0.012	ft/day
	4.32	ft/year
Flow direction:	140.87	degrees from the positive x-axis

This spreadsheet is from the paper, "A Spreadsheet Method For Estimating Hydraulic Gradient With Heads From Multiple Wells" submitted to Ground Water, March, 2002. To use the program, enter the coordinates for the well locations in the columns labeled x and y (part of the [X] matrix), and the water levels in the z column. The matrices are automatically updated and the gradient magnitude and direction are calculated in cell H30 and H35.



Snohomish County Solid Waste

Environmental Services Section

8915 Cathcart Way

Snohomish, WA 98296

Tel: (360) 668-7652

GROUND WATER ELEVATIONS

Cathcart

Location	Aquifer	Date	MSL Water Elev (Ft)
G-09D	D	7/30/2019	219.72
G-10D	D	7/30/2019	236.77



Snohomish County Solid Waste

Environmental Services Section

8915 Cathcart Way

Snohomish, WA 98296

Tel: (360) 668-7652

GROUND WATER ELEVATIONS

Cathcart

Location	Aquifer	Date	MSL Water Elev (Ft)
G-01D	D	10/23/2019	206.29
G-02D	D	10/22/2019	210.50
G-06B	D	10/22/2019	212.02
G-08D2	D	10/22/2019	213.64
G-09D	D	10/23/2019	221.10
G-10D	D	10/23/2019	237.83
G-13D	D	10/22/2019	221.37
G-14D	D	10/22/2019	298.14
G-24D	D	10/23/2019	302.30

Site: **Cathcart Landfill - Deep Aquifer**

Measurement Date: **10/23/2019**

Well ID	[X] matrix		GW Elev.	[D] matrix												
	X-axis	Y-axis		D	Pt											
G-01D	431.12	3977.30	206.29	1												
G-02D	733.79	3884.79	210.5	1	431.12	733.79	488.43	728.1	739.2	496	220.3	1266	781			
G-06B	488.43	3765.90	212.02	1	3977.3	3884.79	3765.9	4156	3614.85	3593	3939	2338	528.9			
G-08D2	728.12	4156.36	213.64	1	206.29	210.5	212.02	213.6	221.1	237.8	221.4	298.1	302.3			
G-09D	739.20	3614.85	221.10	1												
G-10D	495.97	3593.41	237.83	1												
G-13D	220.31	3939.18	221.37	1												
G-14D	1266.00	2337.53	298.14	1	4546675.575	18125521.98	1446213									
G-24D	780.99	528.85	302.30	1	18125521.98	109608443.7	6707299									
10	0	0	0	1	1446213.232	6707299.242	512186.1									
11	0	0	0	1												
12	0	0	0	1												
13	0	0	0	1	2.31076E-06	8.631E-08	-7.65E-06									
14	0	0	0	1	8.631E-08	4.91513E-08	-8.87E-07									
15	0	0	0	1	-7.65495E-06	-8.87363E-07	3.52E-05									
16	0	0	0	1												
17	0	0	0	1												
18	0	0	0	1	-0.000239644	0.000419542	-0.000169	4E-04	0.000327602	-4E-04	-8E-04	8E-04	-5E-04			
19	0	0	0	1	4.96452E-05	6.74859E-05	3.91E-05	8E-05	4.52789E-05	8E-06	2E-05	-4E-05	-2E-04			
20	0	0	0	1	0.000429298	-0.001657396	0.00038	-0.002	-0.001086288	0.001	0.003	-0.001	0.004			

{[P]t{P]}{[P]t} [D] = [A] matrix

- A -8.46821E-05
- B 8.84199E-05
- C 0.003226561

Groundwater Gradient:	0.0379
Conductivity (ft/day):	0.029
Effective porosity:	10%
GW velocity:	0.011 ft/day
	4.02 ft/year
Flow direction:	133.76 degrees from the positive x-axis

This spreadsheet is from the paper, "A Spreadsheet Method For Estimating Hydraulic Gradient With Heads From Multiple Wells" submitted to Ground Water, March, 2002. To use the program, enter the coordinates for the well locations in the columns labeled x and y (part of the [X] matrix), and the water levels in the z column. The matrices are automatically updated and the gradient magnitude and direction are calculated in cell H30 and H35.

Appendix B

Groundwater Analytical Summary Tables

Shallow Wells

Groundwater Analytical Summary - Shallow Wells: First Quarter 2019
Cathcart Landfill, Snohomish County, WA

	Statistical Method	Number of Samples	Number of Detects	Prediction Limit	Primary GW Stds 173-200	G-09S				G-10S					
						1/15/19	D	V	Tr	Ch	1/15/19	D	V	Tr	Ch
CONVENTIONAL CHEMISTRY PARAMETERS (mg/L)															
Alkalinity (as CaCO3)	nonpar	77	77	200	--	310		V	I	N	440		V		
Ammonia Nitrogen	lognor	73	42	14.5571	--	0.005	U				0.215				
Bicarbonate	nonpar	77	77	200	--	310		V	I	N	440		V		
Calcium, Dissolved	normal	75	75	23.9949	--	86.8		V	D	N	109		V	D N	
Chemical Oxygen Demand	nonpar	77	10	28	--	10	U				10	U			
Chloride	nonpar	77	76	18.3	250	5.3			D	N	12.5			D N	
Conductivity (umhos/cm)	nonpar	76	76	540	700	1000		V			1400		V		
Magnesium, Dissolved	lognor	73	64	57.0254	--	31.1			D	N	24.8			D N	
Nitrate Nitrogen (mg-N/L)	lognor	74	69	2.4692	10	0.13				Y	0.01	U			
Nitrite Nitrogen (mg-N/L)	lognor	69	43	24.3009	1	0.001	U				0.001	U			
pH (std units)	normal	77	77	5.75-10.14	6.5-8.5	6.25					6.46				
Potassium, Dissolved	lognor	75	74	2.7196	--	5.05		V			3.87		V		
Sodium, Dissolved	normal	75	75	125.8433	20	80.6			D	N	164		V	D Y	
Sulfate	normal	76	76	135.0174	250	249		V			390		V		
Total Dissolved Solids	normal	77	77	405.899	500	690		V			970		V		
Total Organic Carbon	nonpar	77	68	22.0	--	4.2					4.0			D Y	
DISSOLVED METALS EPA Methods 200.7/200.8 (mg/L)															
Antimony	nonpar	77	34	0.0019	0.006	0.0003	U				0.0003	U			
Arsenic	nonpar	72	68	0.004	0.00005	0.000927				Y	0.00813		V	I N	
Barium	lognor	70	55	4.312	1	0.0015					0.0027				
Beryllium	nonpar	77	0	0.0005	0.004	0.0005	U				0.0005	U			
Cadmium	nonpar	72	35	0.001	0.005	0.00005	U				0.00005	U			
Chromium	nonpar	75	28	0.015	0.05	0.005	U				0.005	U			
Cobalt	nonpar	76	5	0.003	--	0.005	U				0.005	U			
Copper	nonpar	73	39	0.115	1	0.005	U				0.005	U			
Iron	lognor	74	46	13.6764	0.3	0.03					11.0				
Lead	nonpar	77	33	0.0027	0.05	0.000122					0.0001	U			
Manganese	lognor	70	55	4.3738	0.05	0.0663					3.750			D Y	
Nickel	nonpar	75	19	0.038	0.1	0.016					0.006				
Selenium	nonpar	76	6	0.002	0.01	0.00254		V			0.00077				
Silver	nonpar	71	4	0.0002	0.05	0.0001	U				0.0001	U			
Thallium	nonpar	76	6	0.003	0.002	0.00005	U				0.00005	U			
Vanadium	nonpar	77	2	0.01	--	0.01	U				0.01	U			
Zinc	nonpar	76	33	0.03	5	0.005					0.005	U			
TOTAL METALS EPA Methods 200.7/200.8 (mg/L)															
Antimony					0.006	0.0003	U				0.0003	U			
Arsenic					0.00005	0.00123					0.00436				
Barium					1	0.023					0.0065				
Beryllium					0.004	0.0005	U				0.0005	U			
Cadmium					0.005	0.00005	U				0.00005	U			
Chromium					0.05	0.021					0.005	U			
Cobalt					--	0.005	U				0.005	U			
Copper					1	0.007					0.005	U			
Iron					0.3	3.64					12.2				
Lead					0.05	0.00262					0.00010	U			
Manganese					0.05	0.24					3.56				
Nickel					0.1	0.04					0.006				
Selenium					0.01	0.00994					0.00238				
Silver					0.05	0.0117					0.0001	U			
Thallium					0.002	0.00005	U				0.00005	U			
Vanadium					--	0.014					0.01	U			
Zinc					5	0.012					0.005	U			
VOLATILE ORGANIC COMPOUNDS (VOCs) EPA Method 8260 (µg/L)															
1,1,1-Trichloroethane					200	1	U				1	U			
1,1,2,2-Tetrachloroethane					--	1	U				1	U			
1,1,2-Trichloroethane					--	1	U				1	U			
1,1-Dichloroethane					1	1	U				1	U			
1,1-Dichloroethylene					--	1	U				1	U			
1,2,3-Trichloropropane					--	1	U				1	U			
1,2-Dibromo-3-chloropropane					0.2	5	U				5	U			
1,2-Dibromoethane					0.001	0.01	U				0.01	U			
1,2-Dichlorobenzene					--	1	U				1	U			

Groundwater Analytical Summary - Shallow Wells: First Quarter 2019
Cathcart Landfill, Snohomish County, WA

	Statistical Method	Number of Samples	Number of Detects	Prediction Limit	Primary GW Stds 173-200	G-09S					G-10S						
						1/15/19	D	V	Tr	Ch	1/15/19	D	V	Tr	Ch		
VOLATILE ORGANIC COMPOUNDS (VOCs) EPA Method 8260 (µg/L) (cont.)																	
1,2-Dichloroethane					0.5	0.5	U					0.5	U				
1,2-Dichloropropane					0.6	0.6	U					0.6	U				
1,4-Dichlorobenzene					4	1	U					1	U				
2-Butanone					--	5	U					5	U				
2-Hexanone					--	5	U					5	U				
4-Methyl-2-Pentanone (MIBK)					--	5	U					5	U				
Acetone					--	5	U					5	U				
Acrylonitrile					0.07	0.01	U					0.01	U				
Benzene					1	1	U					1	U				
Bromodichloromethane					0.3	0.3	U					0.3	U				
Bromoform					5	1	U					1	U				
Bromomethane					--	1	U					1	U				
Carbon Disulfide					--	1	U					1	U				
Carbon Tetrachloride					0.3	0.3	U					0.3	U				
Chlorobenzene					--	0.2	U					0.2	U				
Chlorodibromomethane					0.5	0.5	U					0.5	U				
Chloroethane					--	1	U					1	U				
Chloroform					7	1	U					1	U				
Chloromethane					--	1	U					1	U				
cis-1,2-Dichloroethene					--	0.2	U					0.2	U				
cis-1,3-Dichloropropene					0.2	0.2	U					0.2	U				
Dibromomethane					--	0.01	U					0.01	U				
Ethyl Benzene					--	1	U					1	U				
m,p-Xylene					--	1	U					1	U				
Methyl iodide					--	1	U					1	U				
Methylene Chloride					5	2	U					2	U				
o-Xylene					--	1	U					1	U				
Styrene					--	1	U					1	U				
Tetrachloroethylene					0.8	0.8	U					0.8	U				
Toluene					--	1	U					1	U				
trans-1,2-Dichloroethene					--	1	U					1	U				
trans-1,3-Dichloropropene					0.2	0.2	U					0.2	U				
trans-1,4-Dichloro-2-butene					--	5	U					5	U				
Trichlorethene (1,1,2-Trichloroethylene)					3	1	U					1	U				
Trichlorofluoromethane					--	1	U					1	U				
Vinyl Acetate					--	5	U					5	U				
Vinyl Chloride					0.02	0.01	U					0.01	U				

D: U = Indicates compound was not detected at the given reporting limit; X indicates that the compound was detected in the trip blank and contamination is suspected.

V: E= Exceedance, waiting verification based on subsequent lab data; V= Exceedance verified based on previous lab data; P=Passed, previous exceedance not verified based on current lab data.

Tr: I=increasing Trend, D=Decreasing Trend;

Ch: Y indicates a change in trend from previous quarter; N means no change in trend.

Values in purple exceed the prediction limit; indicates that a value exceeded the Groundwater Standards

The groundwater standards listed are based on the Washington Administrative Code (WAC) 173-200 groundwater limits as modified by the TMS 91-11 standards - the most restrictive of the two is used.

X = Methylene chloride was measured in the trip blank, but not in the lab blank - contaminations during transport is suspected.

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result	Pred. Limit
Alkalinity (as cacO3)	mg/L	G-01A	10/17/2018		16.0000	200.0000
Ammonia nitrogen	mg-N/L	G-01A	10/17/2018		0.0060	14.5571
Bicarbonate	mg/L	G-01A	10/17/2018		16.0000	200.0000
Chemical oxygen demand	mg/L	G-01A	10/17/2018		16.0000	28.0000
Chloride	mg/L	G-01A	10/17/2018		2.5000	18.3000
Conductivity	umhos/cm	G-01A	10/17/2018		150.0000	540.0000
Dissolved antimony	mg/L	G-01A	10/17/2018	ND	0.0003	0.0019
Dissolved arsenic	mg/L	G-01A	10/17/2018		0.0002	0.0040
Dissolved barium	mg/L	G-01A	10/17/2018		0.0028	4.3120
Dissolved beryllium	mg/L	G-01A	10/17/2018	ND	0.0005	0.0005
Dissolved cadmium	mg/L	G-01A	10/17/2018	ND	0.0001	0.0010
Dissolved calcium	mg/L	G-01A	10/17/2018		15.1000	23.9949
Dissolved chromium	mg/L	G-01A	10/17/2018	ND	0.0050	0.0150
Dissolved cobalt	mg/L	G-01A	10/17/2018	ND	0.0050	0.0030
Dissolved copper	mg/L	G-01A	10/17/2018		0.0060	0.1150
Dissolved iron	mg/L	G-01A	10/17/2018		0.0260	13.6764
Dissolved lead	mg/L	G-01A	10/17/2018	ND	0.0001	0.0027
Dissolved magnesium	mg/L	G-01A	10/17/2018		4.1500	57.0254
Dissolved manganese	mg/L	G-01A	10/17/2018	ND	0.0050	4.3738
Dissolved nickel	mg/L	G-01A	10/17/2018		0.0060	0.0380
Dissolved potassium	mg/L	G-01A	10/17/2018		1.3900	2.7196
Dissolved selenium	mg/L	G-01A	10/17/2018	ND	0.0003	0.0020
Dissolved silver	mg/L	G-01A	10/17/2018	ND	0.0001	0.0002
Dissolved sodium	mg/L	G-01A	10/17/2018		6.5200	125.8433
Dissolved thallium	mg/L	G-01A	10/17/2018	ND	0.0001	0.0030
Dissolved thallium	mg/L	G-01A	10/17/2018	ND	0.0100	0.0100
Dissolved zinc	mg/L	G-01A	10/17/2018	ND	0.0050	0.0300
Nitrate nitrogen	mg-N/L	G-01A	10/17/2018		0.3400	2.4692
Nitrite nitrogen	mg-N/L	G-01A	10/17/2018	ND	0.0010	24.3009
pH	std units	G-01A	10/17/2018		5.5900 *	5.75 - 10.14
Sulfate	mg/L	G-01A	10/17/2018		50.9000	135.0174
Total dissolved solids	mg/L	G-01A	10/17/2018		180.0000	405.8990
Total organic carbon	mg/L	G-01A	10/17/2018		4.6000	22.0000
Alkalinity (as cacO3)	mg/L	G-04A	04/18/2018		120.0000	200.0000
Ammonia nitrogen	mg-N/L	G-04A	04/18/2018		0.4120	14.5571
Bicarbonate	mg/L	G-04A	04/18/2018		120.0000	200.0000
Chemical oxygen demand	mg/L	G-04A	04/18/2018		98.0000 *	28.0000
Chloride	mg/L	G-04A	04/18/2018		7.2000	18.3000
Conductivity	umhos/cm	G-04A	04/18/2018		470.0000	540.0000
Dissolved antimony	mg/L	G-04A	04/18/2018	ND	0.0003	0.0019
Dissolved arsenic	mg/L	G-04A	04/18/2018		0.0161 ***	0.0040
Dissolved barium	mg/L	G-04A	04/18/2018		0.0080	4.3120
Dissolved beryllium	mg/L	G-04A	04/18/2018	ND	0.0005	0.0005
Dissolved cadmium	mg/L	G-04A	04/18/2018		0.0002	0.0010
Dissolved calcium	mg/L	G-04A	04/18/2018		38.9000 ***	23.9949
Dissolved chromium	mg/L	G-04A	04/18/2018		0.0060	0.0150
Dissolved cobalt	mg/L	G-04A	04/18/2018	ND	0.0050 **	0.0030
Dissolved copper	mg/L	G-04A	04/18/2018	ND	0.0050	0.1150
Dissolved iron	mg/L	G-04A	04/18/2018		29.7000 *	13.6764
Dissolved lead	mg/L	G-04A	04/18/2018		0.0002	0.0027
Dissolved magnesium	mg/L	G-04A	04/18/2018		22.4000	57.0254
Dissolved manganese	mg/L	G-04A	04/18/2018		5.5120 *	4.3738
Dissolved nickel	mg/L	G-04A	04/18/2018	ND	0.0050	0.0380
Dissolved potassium	mg/L	G-04A	04/18/2018		2.2900	2.7196
Dissolved selenium	mg/L	G-04A	04/18/2018		0.0007	0.0020
Dissolved silver	mg/L	G-04A	04/18/2018	ND	0.0001	0.0002
Dissolved sodium	mg/L	G-04A	04/18/2018		13.3000	125.8433
Dissolved thallium	mg/L	G-04A	04/18/2018		0.0001	0.0030
Dissolved vanadium	mg/L	G-04A	04/18/2018	ND	0.0100	0.0100
Dissolved zinc	mg/L	G-04A	04/18/2018	ND	0.0050	0.0300
Nitrate nitrogen	mg-N/L	G-04A	04/18/2018	ND	0.0100	2.4692
Nitrite nitrogen	mg-N/L	G-04A	04/18/2018	ND	0.0010	24.3009
pH	std units	G-04A	04/18/2018		6.1300	5.75 - 10.14
Sulfate	mg/L	G-04A	04/18/2018		12.1000	135.0174
Total dissolved solids	mg/L	G-04A	04/18/2018		360.0000	405.8990
Total organic carbon	mg/L	G-04A	04/18/2018		2.3000 **	22.0000
Alkalinity (as cacO3)	mg/L	G-08D1	10/16/2018		150.0000	200.0000

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result		Pred. Limit
Ammonia nitrogen	mg-N/L	G-08D1	10/16/2018		0.0940		14.5571
Bicarbonate	mg/L	G-08D1	10/16/2018		110.0000		200.0000
Chemical oxygen demand	mg/L	G-08D1	10/16/2018	ND	10.0000		28.0000
Chloride	mg/L	G-08D1	10/16/2018		3.3000		18.3000
Conductivity	umhos/cm	G-08D1	10/16/2018		420.0000		540.0000
Dissolved antimony	mg/L	G-08D1	10/16/2018	ND	0.0003		0.0019
Dissolved arsenic	mg/L	G-08D1	10/16/2018		0.0022		0.0040
Dissolved barium	mg/L	G-08D1	10/16/2018		0.0031		4.3120
Dissolved beryllium	mg/L	G-08D1	10/16/2018	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-08D1	10/16/2018	ND	0.0001		0.0010
Dissolved calcium	mg/L	G-08D1	10/16/2018		0.8500		23.9949
Dissolved chromium	mg/L	G-08D1	10/16/2018	ND	0.0050		0.0150
Dissolved cobalt	mg/L	G-08D1	10/16/2018	ND	0.0050		0.0030
Dissolved copper	mg/L	G-08D1	10/16/2018	ND	0.0050		0.1150
Dissolved iron	mg/L	G-08D1	10/16/2018		0.5460		13.6764
Dissolved lead	mg/L	G-08D1	10/16/2018		0.0003		0.0027
Dissolved magnesium	mg/L	G-08D1	10/16/2018		0.2300		57.0254
Dissolved manganese	mg/L	G-08D1	10/16/2018		0.0094		4.3738
Dissolved nickel	mg/L	G-08D1	10/16/2018	ND	0.0050		0.0380
Dissolved potassium	mg/L	G-08D1	10/16/2018		0.4500		2.7196
Dissolved selenium	mg/L	G-08D1	10/16/2018	ND	0.0003		0.0020
Dissolved silver	mg/L	G-08D1	10/16/2018	ND	0.0001		0.0002
Dissolved sodium	mg/L	G-08D1	10/16/2018		95.9000		125.8433
Dissolved thallium	mg/L	G-08D1	10/16/2018	ND	0.0001		0.0030
Dissolved vanadium	mg/L	G-08D1	10/16/2018	ND	0.0100		0.0100
Dissolved zinc	mg/L	G-08D1	10/16/2018	ND	0.0050		0.0300
Nitrate nitrogen	mg-N/L	G-08D1	10/16/2018		0.5400		2.4692
Nitrite nitrogen	mg-N/L	G-08D1	10/16/2018		0.0380		24.3009
pH	std units	G-08D1	10/16/2018		9.2700		5.75 - 10.14
Sulfate	mg/L	G-08D1	10/16/2018		102.0000		135.0174
Total dissolved solids	mg/L	G-08D1	10/16/2018		300.0000		405.8990
Total organic carbon	mg/L	G-08D1	10/16/2018		1.1000		22.0000
Alkalinity (as cacO3)	mg/L	G-09S	01/15/2019		310.0000	***	200.0000
Ammonia nitrogen	mg-N/L	G-09S	01/15/2019	ND	0.0050		14.5571
Bicarbonate	mg/L	G-09S	01/15/2019		310.0000	***	200.0000
Chemical oxygen demand	mg/L	G-09S	01/15/2019	ND	10.0000		28.0000
Chloride	mg/L	G-09S	01/15/2019		5.3000		18.3000
Conductivity	umhos/cm	G-09S	01/15/2019		1000.0000	***	540.0000
Dissolved antimony	mg/L	G-09S	01/15/2019	ND	0.0003		0.0019
Dissolved arsenic	mg/L	G-09S	01/15/2019		0.0009		0.0040
Dissolved barium	mg/L	G-09S	01/15/2019		0.0015		4.3120
Dissolved beryllium	mg/L	G-09S	01/15/2019	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-09S	01/15/2019	ND	0.0001		0.0010
Dissolved calcium	mg/L	G-09S	01/15/2019		86.8000	***	23.9949
Dissolved chromium	mg/L	G-09S	01/15/2019	ND	0.0050		0.0150
Dissolved cobalt	mg/L	G-09S	01/15/2019	ND	0.0050		0.0030
Dissolved copper	mg/L	G-09S	01/15/2019	ND	0.0050		0.1150
Dissolved iron	mg/L	G-09S	01/15/2019		0.0300		13.6764
Dissolved lead	mg/L	G-09S	01/15/2019		0.0001		0.0027
Dissolved magnesium	mg/L	G-09S	01/15/2019		31.1000		57.0254
Dissolved manganese	mg/L	G-09S	01/15/2019		0.0663		4.3738
Dissolved nickel	mg/L	G-09S	01/15/2019		0.0160		0.0380
Dissolved potassium	mg/L	G-09S	01/15/2019		5.0500	***	2.7196
Dissolved selenium	mg/L	G-09S	01/15/2019		0.0025	***	0.0020
Dissolved silver	mg/L	G-09S	01/15/2019	ND	0.0001		0.0002
Dissolved sodium	mg/L	G-09S	01/15/2019		80.6000		125.8433
Dissolved thallium	mg/L	G-09S	01/15/2019	ND	0.0001		0.0030
Dissolved vanadium	mg/L	G-09S	01/15/2019	ND	0.0100		0.0100
Dissolved zinc	mg/L	G-09S	01/15/2019		0.0050		0.0300
Nitrate nitrogen	mg-N/L	G-09S	01/15/2019		0.1300		2.4692
Nitrite nitrogen	mg-N/L	G-09S	01/15/2019	ND	0.0010		24.3009
pH	std units	G-09S	01/15/2019		6.2500		5.75 - 10.14
Sulfate	mg/L	G-09S	01/15/2019		249.0000	***	135.0174
Total dissolved solids	mg/L	G-09S	01/15/2019		690.0000	***	405.8990
Total organic carbon	mg/L	G-09S	01/15/2019		4.2000		22.0000
Alkalinity (as cacO3)	mg/L	G-10S	01/15/2019		440.0000	***	200.0000
Ammonia nitrogen	mg-N/L	G-10S	01/15/2019		0.2150		14.5571

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result		Pred. Limit
Bicarbonate	mg/L	G-10S	01/15/2019		440.0000	***	200.0000
Chemical oxygen demand	mg/L	G-10S	01/15/2019	ND	10.0000		28.0000
Chloride	mg/L	G-10S	01/15/2019		12.5000		18.3000
Conductivity	umhos/cm	G-10S	01/15/2019		1400.0000	***	540.0000
Dissolved antimony	mg/L	G-10S	01/15/2019	ND	0.0003		0.0019
Dissolved arsenic	mg/L	G-10S	01/15/2019		0.0081	***	0.0040
Dissolved barium	mg/L	G-10S	01/15/2019		0.0027		4.3120
Dissolved beryllium	mg/L	G-10S	01/15/2019	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-10S	01/15/2019	ND	0.0001		0.0010
Dissolved calcium	mg/L	G-10S	01/15/2019		109.0000	***	23.9949
Dissolved chromium	mg/L	G-10S	01/15/2019	ND	0.0050		0.0150
Dissolved cobalt	mg/L	G-10S	01/15/2019	ND	0.0050		0.0030
Dissolved copper	mg/L	G-10S	01/15/2019	ND	0.0050		0.1150
Dissolved iron	mg/L	G-10S	01/15/2019		11.0000		13.6764
Dissolved lead	mg/L	G-10S	01/15/2019	ND	0.0001		0.0027
Dissolved magnesium	mg/L	G-10S	01/15/2019		24.8000		57.0254
Dissolved manganese	mg/L	G-10S	01/15/2019		3.7500		4.3738
Dissolved nickel	mg/L	G-10S	01/15/2019		0.0060		0.0380
Dissolved potassium	mg/L	G-10S	01/15/2019		3.8700	***	2.7196
Dissolved selenium	mg/L	G-10S	01/15/2019		0.0008		0.0020
Dissolved silver	mg/L	G-10S	01/15/2019	ND	0.0001		0.0002
Dissolved sodium	mg/L	G-10S	01/15/2019		164.0000	***	125.8433
Dissolved thallium	mg/L	G-10S	01/15/2019	ND	0.0001		0.0030
Dissolved vanadium	mg/L	G-10S	01/15/2019	ND	0.0100		0.0100
Dissolved zinc	mg/L	G-10S	01/15/2019	ND	0.0050		0.0300
Nitrate nitrogen	mg-N/L	G-10S	01/15/2019	ND	0.0100		2.4692
Nitrite nitrogen	mg-N/L	G-10S	01/15/2019	ND	0.0010		24.3009
pH	std units	G-10S	01/15/2019		6.4600		5.75 - 10.14
Sulfate	mg/L	G-10S	01/15/2019		390.0000	***	135.0174
Total dissolved solids	mg/L	G-10S	01/15/2019		970.0000	***	405.8990
Total organic carbon	mg/L	G-10S	01/15/2019		4.0000		22.0000
Alkalinity (as cacO3)	mg/L	G-11S	10/17/2018		66.0000		200.0000
Ammonia nitrogen	mg-N/L	G-11S	10/17/2018		0.0065		14.5571
Bicarbonate	mg/L	G-11S	10/17/2018		66.0000		200.0000
Chemical oxygen demand	mg/L	G-11S	10/17/2018	ND	10.0000		28.0000
Chloride	mg/L	G-11S	10/17/2018		4.6000		18.3000
Conductivity	umhos/cm	G-11S	10/17/2018		215.0000		540.0000
Dissolved antimony	mg/L	G-11S	10/17/2018	ND	0.0003		0.0019
Dissolved arsenic	mg/L	G-11S	10/17/2018		0.0006		0.0040
Dissolved barium	mg/L	G-11S	10/17/2018		0.0011		4.3120
Dissolved beryllium	mg/L	G-11S	10/17/2018	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-11S	10/17/2018	ND	0.0001		0.0010
Dissolved calcium	mg/L	G-11S	10/17/2018		9.8650		23.9949
Dissolved chromium	mg/L	G-11S	10/17/2018	ND	0.0050		0.0150
Dissolved cobalt	mg/L	G-11S	10/17/2018	ND	0.0050		0.0030
Dissolved copper	mg/L	G-11S	10/17/2018	ND	0.0050		0.1150
Dissolved iron	mg/L	G-11S	10/17/2018		0.0140		13.6764
Dissolved lead	mg/L	G-11S	10/17/2018		0.0001		0.0027
Dissolved magnesium	mg/L	G-11S	10/17/2018		2.1300		57.0254
Dissolved manganese	mg/L	G-11S	10/17/2018	ND	0.0050		4.3738
Dissolved nickel	mg/L	G-11S	10/17/2018	ND	0.0050		0.0380
Dissolved potassium	mg/L	G-11S	10/17/2018		1.0800		2.7196
Dissolved selenium	mg/L	G-11S	10/17/2018	ND	0.0003		0.0020
Dissolved silver	mg/L	G-11S	10/17/2018	ND	0.0001		0.0002
Dissolved sodium	mg/L	G-11S	10/17/2018		41.2500		125.8433
Dissolved thallium	mg/L	G-11S	10/17/2018	ND	0.0001		0.0030
Dissolved vanadium	mg/L	G-11S	10/17/2018	ND	0.0100		0.0100
Dissolved zinc	mg/L	G-11S	10/17/2018	ND	0.0050		0.0300
Nitrate nitrogen	mg-N/L	G-11S	10/17/2018		0.0705		2.4692
Nitrite nitrogen	mg-N/L	G-11S	10/17/2018	ND	0.0010		24.3009
pH	std units	G-11S	10/17/2018		6.7000		5.75 - 10.14
Sulfate	mg/L	G-11S	10/17/2018		34.6500		135.0174
Total dissolved solids	mg/L	G-11S	10/17/2018		215.0000		405.8990

Table 2**Most Current Downgradient Monitoring Data**

Constituent	Units	Well	Date	Result	Pred. Limit
Total organic carbon	mg/L	G-11S	10/17/2018	2.2000	22.0000

- * - Current value failed - awaiting verification.
 - ** - Current value passed - previous exceedance not verified.
 - *** - Current value failed - exceedance verified.
 - **** - Current value passed - awaiting one more verification.
 - ***** - Insufficient background data to compute prediction limit.
- ND = Not Detected, Result = detection limit.

Table 5

Summary Statistics and Prediction Limits

Constituent	Units	Detect	N	Mean	SD	alpha	Factor	Pred Limit	Type		Conf
Alkalinity (as cacO ₃)	mg/L	77	77					200.0000	nonpar		0.99
Ammonia nitrogen	mg-N/L	42	73	-2.2112	2.0410	0.0100	2.3955	14.5571	lognor		
Bicarbonate	mg/L	77	77					200.0000	nonpar		0.99
Chemical oxygen demand	mg/L	10	77					28.0000	nonpar		0.99
Chloride	mg/L	76	77					18.3000	nonpar		0.99
Conductivity	umhos/cm	76	76					540.0000	nonpar		0.99
Dissolved antimony	mg/L	34	77					0.0019	nonpar		0.99
Dissolved arsenic	mg/L	68	72					0.0040	nonpar		0.99
Dissolved barium	mg/L	55	70	-4.5142	2.4913	0.0100	2.3985	4.3120	lognor		
Dissolved beryllium	mg/L	0	77					0.0005	nonpar	***	0.99
Dissolved cadmium	mg/L	35	72					0.0010	nonpar		0.99
Dissolved calcium	mg/L	75	75	7.2573	6.9927	0.0100	2.3936	23.9949	normal		
Dissolved chromium	mg/L	28	75					0.0150	nonpar		0.99
Dissolved cobalt	mg/L	5	76					0.0030	nonpar		0.99
Dissolved copper	mg/L	39	73					0.1150	nonpar		0.99
Dissolved iron	mg/L	46	74	-1.8502	1.8650	0.0100	2.3945	13.6764	lognor		
Dissolved lead	mg/L	33	77					0.0027	nonpar		0.99
Dissolved magnesium	mg/L	64	73	-0.1091	1.7335	0.0100	2.3955	57.0254	lognor		
Dissolved manganese	mg/L	55	70	-4.1958	2.3645	0.0100	2.3985	4.3738	lognor		
Dissolved nickel	mg/L	19	75					0.0380	nonpar		0.99
Dissolved potassium	mg/L	74	75	-0.7292	0.7226	0.0100	2.3936	2.7196	lognor		
Dissolved selenium	mg/L	6	76					0.0020	nonpar		0.99
Dissolved silver	mg/L	4	71					0.0002	nonpar		0.99
Dissolved sodium	mg/L	75	75	89.4787	15.1926	0.0100	2.3936	125.8433	normal		
Dissolved thallium	mg/L	6	76					0.0030	nonpar		0.99
Dissolved vanadium	mg/L	2	77					0.0100	nonpar		0.99
Dissolved zinc	mg/L	33	76					0.0300	nonpar		0.99
Nitrate nitrogen	mg-N/L	69	74	-2.0171	1.2199	0.0100	2.3945	2.4692	lognor		
Nitrite nitrogen	mg-N/L	43	69	-3.4915	2.7846	0.0100	2.3996	24.3009	lognor		
pH	std units	77	77	7.9443	0.8245	0.0100	2.6592	5.75 - 10.14	normal		
Sulfate	mg/L	76	76	58.8358	31.8395	0.0100	2.3927	135.0174	normal		
Total dissolved solids	mg/L	77	77	284.2857	50.8462	0.0100	2.3918	405.8990	normal		
Total organic carbon	mg/L	68	77					22.0000	nonpar		0.99

Conf = confidence level for passing initial test or one of two verification resamples at all downgradient wells for a single constituent (nonparametric test only).

* - Insufficient Data.

** - Calculated limit raised to Manual Reporting Limit.

*** - Nonparametric limit based on ND value.

For transformed data, mean and SD in transformed units and prediction limit in original units.

All sample sizes and statistics are based on outlier free data.

For nonparametric limits, median reporting limits are substituted for extreme reporting limit values.

Groundwater Analytical Summary - Shallow Wells: Second Quarter 2019
Cathcart Landfill, Snohomish County, WA

	Statistical Method	Number of Samples	Number of Detects	Prediction Limit	Primary GW Stds 173-200	Downgradient Wells																				Upgradient Wells																				
						G-01A				G-04A				G-08D1				G-09S				G-10S				G-11S				G-14S				G-24S												
						4/24/19	D	V	Tr	Ch	4/24/19	D	V	Tr	Ch	4/23/19	D	V	Tr	Ch	4/23/19	D	V	Tr	Ch	4/23/19	D	V	Tr	Ch	4/24/19	D	V	Tr	Ch	4/23/19	D	V	Tr	Ch	4/24/19	D	V	Tr	Ch	
CONVENTIONAL CHEMISTRY PARAMETERS (mg/L)																																														
Alkalinity (as CaCO3)	nonpar	79	79	200	--	18					260		E			160					330		V	I	N	410		V				80			D	N	180					110				
Ammonia Nitrogen	lognor	75	42	15.5283	--	0.02	U				0.034					0.081					0.02	U			0.249						0.02	U				0.02	U				0.02	U				
Bicarbonate	nonpar	79	79	200	--	18					260		E			150					330		V	I	N	410		V				80			D	N	180					110				
Calcium, Dissolved	normal	77	77	23.8314	--	9.9					1.02		P			0.9			I	N	102		V	D	Y	96.6		V	D	N	7.03					0.67			I	N	10.2					
Chemical Oxygen Demand	nonpar	79	10	28	--	10	U				10	U	P			10	U				10	U			10	U					10	U				10	U				10	U				
Chloride	nonpar	79	78	18.3	250	0.08					8.05			I	N	2.88			D	N	3.78			D	N	8.92			D	N	2.35					1.86			D	N	6.07					
Conductivity (umhos/cm)	nonpar	78	78	540	700	110					680		E			390					920		V			1300						220			D	N	380			D	N	390				
Magnesium, Dissolved	lognor	75	65	55.5098	--	2.86					0.2	U	P			0.48					23.7			D	Y	23.7			D	N	1.46					0.2	U				3.11					
Nitrate Nitrogen (mg-N/L)	lognor	76	71	2.3688	10	0.059			I	N	0.15					0.11					0.01	U		Y	0.01	U					0.01	U				0.04			D	N	0.065					
Nitrite Nitrogen (mg-N/L)	lognor	71	44	24.67	1	0.002					0.008					0.002			D	N	0.002	U			0.002	U					0.002	U				0.002	U				0.007					
pH (std units)	normal	79	79	5.74-10.17	6.5-8.5	6.14		P		Y	6.09					9.68				Y	6.27				6.57						6.76					9.31			I	N	7.11				Y	
Potassium, Dissolved	lognor	77	75	2.7105	--	0.58					0.30					0.41			I	N	3.68		V		3.68		V				0.66					0.2	U		I	N	0.47				Y	
Sodium, Dissolved	normal	77	77	125.7257	20	4.21			D	N	182		E			109					195		E	Y	195		V				50.1			D	N	104			D	N	78.6					
Sulfate	lognor	78	78	288.1075	250	27.9					82.9					48.4					201				283		P				33.4			D	N	18.4			D	N	169				Y	
Total Dissolved Solids	normal	79	79	404.1141	500	100					450		E			290					660		V		980		V				170			D	N	250			D	Y	280					
Total Organic Carbon	nonpar	79	70	22	--	4.5					45.0		E			3.2			D	N	6.8				4.9			D	Y	3.2					4.7					1.1						
DISSOLVED METALS EPA Methods 200.7/200.8 (mg/L)																																														
Antimony	nonpar	79	34	0.0019	0.006	0.0003	U				0.0003	U				0.0003	U				0.0003	U			0.0003	U				0.0003	U				0.0003	U				0.0003	U					
Arsenic	nonpar	74	70	0.004	0.00005	0.000204					0.00336		P			0.00132					0.000768			Y	0.00576		V	I	N	0.00074					0.00275					0.000619			D	N		
Barium	lognor	72	57	3.9122	1	0.0016					0.0005	U			0.0005	U				0.0065				0.0065						0.0013					0.0014					0.0033			D	N		
Beryllium	nonpar	79	0	0.0005	0.004	0.0005	U				0.0005	U			0.0005	U				0.0005	U			0.0005	U					0.0005	U				0.0005	U				0.0005	U					
Cadmium	nonpar	74	35	0.001	0.005	0.00005	U				0.00005	U			0.00005	U				0.000057				0.00005	U					0.00005	U				0.00005	U				0.00005	U					
Chromium	nonpar	77	29	0.015	0.05	0.005	U				0.005	U			0.005	U				0.005	U			0.005	U					0.005	U				0.005	U				0.0061						
Cobalt	nonpar	78	5	0.003	--	0.005	U				0.005	U			0.005	U				0.005	U			0.005	U					0.005	U				0.005	U				0.005	U					
Copper	nonpar	75	40	0.115	1	0.009					0.005	U			0.005	U				0.005	U			0.005	U					0.006					0.005	U				0.017						
Iron	lognor	76	48	12.9457	0.3	0.01	U				0.014		P	I	N	1.39			I	N	11.2				11.2						0.01	U				0.212			I	N	0.026					
Lead	nonpar	79	33	0.0027	0.05	0.0001	U				0.0001	U			0.000375					0.0001	U			0.0001	U					0.0001	U				0.0001	U				0.0001	U					
Manganese	lognor	72	56	4.7921	0.05	0.005	U				0.005	U	P			0.026					3.319				3.32			D	Y	0.0179					0.0067					0.005	U					
Nickel	nonpar	77	20	0.038	0.1	0.005	U				0.006				0.005	U				0.007				0.007						0.006					0.005	U				0.01						
Selenium	nonpar	78	6	0.002	0.01	0.0003	U				0.00031				0.0003	U				0.00099		P		0.00042						0.0003	U				0.0003	U				0.0003	U					
Silver	nonpar	73	4	0.0002	0.05	0.0001	U				0.0001	U			0.0001	U				0.0001	U			0.0001	U					0.0001	U				0.0001	U				0.0001	U					
Thallium	nonpar	78	6	0.003	0.002	0.00005	U				0.00005	U			0.00005	U				0.00005	U			0.00005	U					0.00005	U				0.00005	U				0.00005	U					
Vanadium	nonpar	79	2	0.01	--	0.01	U				0.01	U			0.01	U				0.01	U			0.01	U					0.01	U				0.01	U				0.01	U					
Zinc	nonpar	78	33	0.03	5	0.006					0.005	U			0.005	U				0.005	U			0.005	U					0.005	U				0.005	U				0.005	U					
TOTAL METALS EPA Methods 200.7/200.8 (mg/L)																																														
Antimony				0.006		0.0003	U				0.0003	U			0.0003	U				0.0003	U			0.0003	U					0.0003	U				0.0003	U				0.0003	U					
Arsenic				0.00005		0.000123					0.00222				0.000578					0.00066				0.00513						0.00051					0.0016					0.000547						
Barium				1		0.005	U				0.0064				0.011					0.0094				0.006						0.005	U				0.0388					0.0099						
Beryllium				0.004		0.0005	U				0.0005	U			0.0005	U				0.0005	U			0.0005	U					0.0005	U				0.0005	U				0.0005	U					
Cadmium				0.005		0.00005	U				0.00005	U			0.00005	U				0.00005	U			0.00005	U					0.00005	U				0.00005	U				0.00005	U					
Chromium				0.05		0.005	U				0.017				0.005	U				0.0061				0.005	U					0.005	U				0.011					0.0085						
Cobalt				--		0.005	U				0.005	U			0.005	U				0.005	U			0.005	U					0.005	U				0.005	U				0.005	U					

Groundwater Analytical Summary - Shallow Wells: Second Quarter 2019
Cathcart Landfill, Snohomish County, WA

	Statistical Method	Number of Samples	Number of Detects	Prediction Limit	Primary GW Stds 173-200	Downgradient Wells																				Upgradient Wells														
						G-01A				G-04A				G-08D1				G-09S				G-10S				G-11S				G-14S				G-24S						
						4/24/19	D	V	Tr	Ch	4/24/19	D	V	Tr	Ch	4/23/19	D	V	Tr	Ch	4/23/19	D	V	Tr	Ch	4/23/19	D	V	Tr	Ch	4/24/19	D	V	Tr	Ch	4/23/19	D	V	Tr	Ch
VOLATILE ORGANIC COMPOUNDS (VOCs) EPA Method 8260 (µg/L) (cont.)																																								
1,1-Dichloroethylene					--	1	U				1	U				1	U				1	U				1	U				1	U				1	U			
1,2,3-Trichloropropane					--	1	U				1	U				1	U				1	U				1	U				1	U				1	U			
1,2-Dibromo-3-chloropropane					0.2	5	U				5	U				5	U				5	U				5	U				5	U				5	U			
1,2-Dibromoethane					0.001	0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U			
1,2-Dichlorobenzene					--	1	U				1	U				1	U				1	U				1	U				1	U				1	U			
1,2-Dichloroethane					0.5	0.5	U				0.5	U				0.5	U				0.5	U				0.5	U				0.5	U				0.5	U			
1,2-Dichloropropane					0.6	0.6	U				0.6	U				0.6	U				0.6	U				0.6	U				0.6	U				0.6	U			
1,4-Dichlorobenzene					4	1	U				1	U				1	U				1	U				1	U				1	U				1	U			
2-Butanone					--	5	U				5	U				5	U				5	U				5	U				5	U				5	U			
2-Hexanone					--	5	U				5	U				5	U				5	U				5	U				5	U				5	U			
4-Methyl-2-Pentanone (MIBK)					--	5	U				5	U				5	U				5	U				5	U				5	U				5	U			
Acetone					--	5	U				5	U				5	U				5	U				5	U				5	U				5	U			
Acrylonitrile					0.07	0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U			
Benzene					1	1	U				1	U				1	U				1	U				1	U				1	U				1	U			
Bromodichloromethane					0.3	0.3	U				0.3	U				0.3	U				0.3	U				0.3	U				0.3	U				0.3	U			
Bromoform					5	1	U				1	U				1	U				1	U				1	U				1	U				1	U			
Bromomethane					--	1	U				1	U				1	U				1	U				1	U				1	U				1	U			
Carbon Disulfide					--	1	U				1	U				1	U				1	U				1	U				1	U				1	U			
Carbon Tetrachloride					0.3	0.3	U				0.3	U				0.3	U				0.3	U				0.3	U				0.3	U				0.3	U			
Chlorobenzene					--	0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U			
Chlorodibromomethane					0.5	0.5	U				0.5	U				0.5	U				0.5	U				0.5	U				0.5	U				0.5	U			
Chloroethane					--	1	U				1	U				1	U				1	U				1	U				1	U				1	U			
Chloroform					7	1	U				1	U				1	U				1	U				1	U				1	U				1	U			
Chloromethane					--	1	U				1	U				1	U				1	U				1	U				1	U				1	U			
cis-1,2-Dichloroethene					--	0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U			
cis-1,3-Dichloropropene					0.2	0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U			
Dibromomethane					--	0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U			
Ethyl Benzene					--	1	U				1	U				1	U				1	U				1	U				1	U				1	U			
m,p-Xylene					--	1	U				1	U				1	U				1	U				1	U				1	U				1	U			
Methyl Iodide					--	1	U				1	U				1	U				1	U				1	U				1	U				1	U			
Methylene Chloride					5	2.0	U				2.0	U				2.0	U				2.0	U				2.0	U				2.0	U				2.0	U			
o-Xylene					--	1	U				1	U				1	U				1	U				1	U				1	U				1	U			
Styrene					--	1	U				1	U				1	U				1	U				1	U				1	U				1	U			
Tetrachloroethylene					0.8	0.8	U				0.8	U				0.8	U				0.8	U				0.8	U				0.8	U				0.8	U			
Toluene					--	1	U				1	U				1	U				1	U				1	U				1	U				1	U			
trans-1,2-Dichloroethene					--	1	U				1	U				1	U				1	U				1	U				1	U				1	U			
trans-1,3-Dichloropropene					0.2	0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U			
trans-1,4-Dichloro-2-butene					--	5	U				5	U				5	U				5	U				5	U				5	U				5	U			
Trichloroethene (1,1,2-Trichloroethylene)					3	1	U				1	U				1	U				1	U				1	U				1	U				1	U			
Trichlorofluoromethane					--	1	U				1	U				1	U				1	U				1	U				1	U				1	U			
Vinyl Acetate					--	5	U				5	U				5	U				5	U				5	U				5	U				5	U			
Vinyl Chloride					0.02	0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U			

D: U = Indicates compound was not detected at the given reporting limit; X indicates that the compound was detected in the trip blank and contamination is suspected.
V: E= Exceedance, waiting verification based on subsequent lab data; V= Exceedance verified based on previous lab data; P=Passed, previous exceedance not verified based on current lab data.
Tr: I=Increasing Trend, D=Decreasing Trend;
Ch: Y indicates a change in trend from previous quarter; N means no change in trend.
Values in purple exceed the prediction limit; indicates that a value exceeded the Groundwater Standards
The groundwater standards listed are based on the Washington Administrative Code (WAC) 173-200 groundwater limits as modified by the TMS 91-11 standards.

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result		Pred. Limit
Alkalinity (as cacO ₃)	mg/L	G-01A	04/24/2019		18.0000		200.0000
Ammonia nitrogen	mg-N/L	G-01A	04/24/2019	ND	0.0200		15.5283
Bicarbonate	mg/L	G-01A	04/24/2019		18.0000		200.0000
Chemical oxygen demand	mg/L	G-01A	04/24/2019	ND	10.0000		28.0000
Chloride	mg/L	G-01A	04/24/2019		0.0800		18.3000
Conductivity	umhos/cm	G-01A	04/24/2019		110.0000		540.0000
Dissolved antimony	mg/L	G-01A	04/24/2019	ND	0.0003		0.0019
Dissolved arsenic	mg/L	G-01A	04/24/2019		0.0002		0.0040
Dissolved barium	mg/L	G-01A	04/24/2019		0.0016		3.9122
Dissolved beryllium	mg/L	G-01A	04/24/2019	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-01A	04/24/2019	ND	0.0001		0.0010
Dissolved calcium	mg/L	G-01A	04/24/2019		9.9000		23.8314
Dissolved chromium	mg/L	G-01A	04/24/2019	ND	0.0050		0.0150
Dissolved cobalt	mg/L	G-01A	04/24/2019	ND	0.0050		0.0030
Dissolved copper	mg/L	G-01A	04/24/2019		0.0090		0.1150
Dissolved iron	mg/L	G-01A	04/24/2019	ND	0.0100		12.9457
Dissolved lead	mg/L	G-01A	04/24/2019	ND	0.0001		0.0027
Dissolved magnesium	mg/L	G-01A	04/24/2019		2.8600		55.5098
Dissolved manganese	mg/L	G-01A	04/24/2019	ND	0.0050		4.7921
Dissolved nickel	mg/L	G-01A	04/24/2019	ND	0.0050		0.0380
Dissolved potassium	mg/L	G-01A	04/24/2019		0.5800		2.7105
Dissolved selenium	mg/L	G-01A	04/24/2019	ND	0.0003		0.0020
Dissolved silver	mg/L	G-01A	04/24/2019	ND	0.0001		0.0002
Dissolved sodium	mg/L	G-01A	04/24/2019		4.2100		125.7257
Dissolved thallium	mg/L	G-01A	04/24/2019	ND	0.0001		0.0030
Dissolved thallium	mg/L	G-01A	04/24/2019	ND	0.0100		0.0100
Dissolved zinc	mg/L	G-01A	04/24/2019		0.0060		0.0300
Nitrate nitrogen	mg-N/L	G-01A	04/24/2019		0.0590		2.3688
Nitrite nitrogen	mg-N/L	G-01A	04/24/2019		0.0020		24.6700
pH	std units	G-01A	04/24/2019		6.1400	**	5.74 - 10.17
Sulfate	mg/L	G-01A	04/24/2019		27.9000		288.1075
Total dissolved solids	mg/L	G-01A	04/24/2019		100.0000		404.1141
Total organic carbon	mg/L	G-01A	04/24/2019		4.5000		22.0000
Alkalinity (as cacO ₃)	mg/L	G-04A	04/24/2019		260.0000	*	200.0000
Ammonia nitrogen	mg-N/L	G-04A	04/24/2019		0.0340		15.5283
Bicarbonate	mg/L	G-04A	04/24/2019		260.0000	*	200.0000
Chemical oxygen demand	mg/L	G-04A	04/24/2019	ND	10.0000	**	28.0000
Chloride	mg/L	G-04A	04/24/2019		8.0500		18.3000
Conductivity	umhos/cm	G-04A	04/24/2019		680.0000	*	540.0000
Dissolved antimony	mg/L	G-04A	04/24/2019	ND	0.0003		0.0019
Dissolved arsenic	mg/L	G-04A	04/24/2019		0.0034	**	0.0040
Dissolved barium	mg/L	G-04A	04/24/2019	ND	0.0005		3.9122
Dissolved beryllium	mg/L	G-04A	04/24/2019	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-04A	04/24/2019	ND	0.0001		0.0010
Dissolved calcium	mg/L	G-04A	04/24/2019		1.0200	**	23.8314
Dissolved chromium	mg/L	G-04A	04/24/2019	ND	0.0050		0.0150
Dissolved cobalt	mg/L	G-04A	04/24/2019	ND	0.0050		0.0030
Dissolved copper	mg/L	G-04A	04/24/2019	ND	0.0050		0.1150
Dissolved iron	mg/L	G-04A	04/24/2019		0.0140	**	12.9457
Dissolved lead	mg/L	G-04A	04/24/2019	ND	0.0001		0.0027
Dissolved magnesium	mg/L	G-04A	04/24/2019	ND	0.2000		55.5098
Dissolved manganese	mg/L	G-04A	04/24/2019	ND	0.0050	**	4.7921
Dissolved nickel	mg/L	G-04A	04/24/2019		0.0060		0.0380
Dissolved potassium	mg/L	G-04A	04/24/2019		0.3000		2.7105
Dissolved selenium	mg/L	G-04A	04/24/2019		0.0003		0.0020
Dissolved silver	mg/L	G-04A	04/24/2019	ND	0.0001		0.0002
Dissolved sodium	mg/L	G-04A	04/24/2019		182.0000	*	125.7257
Dissolved thallium	mg/L	G-04A	04/24/2019	ND	0.0001		0.0030
Dissolved vanadium	mg/L	G-04A	04/24/2019	ND	0.0100		0.0100
Dissolved zinc	mg/L	G-04A	04/24/2019	ND	0.0050		0.0300
Nitrate nitrogen	mg-N/L	G-04A	04/24/2019		0.1500		2.3688
Nitrite nitrogen	mg-N/L	G-04A	04/24/2019		0.0080		24.6700
pH	std units	G-04A	04/24/2019		6.0900		5.74 - 10.17
Sulfate	mg/L	G-04A	04/24/2019		82.9000		288.1075
Total dissolved solids	mg/L	G-04A	04/24/2019		450.0000	*	404.1141
Total organic carbon	mg/L	G-04A	04/24/2019		45.0000	*	22.0000
Alkalinity (as cacO ₃)	mg/L	G-08D1	04/23/2019		160.0000		200.0000

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result		Pred. Limit
Ammonia nitrogen	mg-N/L	G-08D1	04/23/2019		0.0810		15.5283
Bicarbonate	mg/L	G-08D1	04/23/2019		150.0000		200.0000
Chemical oxygen demand	mg/L	G-08D1	04/23/2019	ND	10.0000		28.0000
Chloride	mg/L	G-08D1	04/23/2019		2.8800		18.3000
Conductivity	umhos/cm	G-08D1	04/23/2019		390.0000		540.0000
Dissolved antimony	mg/L	G-08D1	04/23/2019	ND	0.0003		0.0019
Dissolved arsenic	mg/L	G-08D1	04/23/2019		0.0013		0.0040
Dissolved barium	mg/L	G-08D1	04/23/2019		0.0056		3.9122
Dissolved beryllium	mg/L	G-08D1	04/23/2019	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-08D1	04/23/2019	ND	0.0001		0.0010
Dissolved calcium	mg/L	G-08D1	04/23/2019		0.9000		23.8314
Dissolved chromium	mg/L	G-08D1	04/23/2019	ND	0.0050		0.0150
Dissolved cobalt	mg/L	G-08D1	04/23/2019	ND	0.0050		0.0030
Dissolved copper	mg/L	G-08D1	04/23/2019	ND	0.0050		0.1150
Dissolved iron	mg/L	G-08D1	04/23/2019		1.3900		12.9457
Dissolved lead	mg/L	G-08D1	04/23/2019		0.0004		0.0027
Dissolved magnesium	mg/L	G-08D1	04/23/2019		0.4800		55.5098
Dissolved manganese	mg/L	G-08D1	04/23/2019		0.0260		4.7921
Dissolved nickel	mg/L	G-08D1	04/23/2019		0.0050		0.0380
Dissolved potassium	mg/L	G-08D1	04/23/2019		0.4100		2.7105
Dissolved selenium	mg/L	G-08D1	04/23/2019	ND	0.0003		0.0020
Dissolved silver	mg/L	G-08D1	04/23/2019	ND	0.0001		0.0002
Dissolved sodium	mg/L	G-08D1	04/23/2019		109.0000		125.7257
Dissolved thallium	mg/L	G-08D1	04/23/2019	ND	0.0001		0.0030
Dissolved vanadium	mg/L	G-08D1	04/23/2019	ND	0.0100		0.0100
Dissolved zinc	mg/L	G-08D1	04/23/2019	ND	0.0050		0.0300
Nitrate nitrogen	mg-N/L	G-08D1	04/23/2019		0.1100		2.3688
Nitrite nitrogen	mg-N/L	G-08D1	04/23/2019		0.0020		24.6700
pH	std units	G-08D1	04/23/2019		9.6800		5.74 - 10.17
Sulfate	mg/L	G-08D1	04/23/2019		48.4000		288.1075
Total dissolved solids	mg/L	G-08D1	04/23/2019		290.0000		404.1141
Total organic carbon	mg/L	G-08D1	04/23/2019		3.2000		22.0000
Alkalinity (as cacO3)	mg/L	G-09S	04/23/2019		330.0000	***	200.0000
Ammonia nitrogen	mg-N/L	G-09S	04/23/2019	ND	0.0200		15.5283
Bicarbonate	mg/L	G-09S	04/23/2019		330.0000	***	200.0000
Chemical oxygen demand	mg/L	G-09S	04/23/2019	ND	10.0000		28.0000
Chloride	mg/L	G-09S	04/23/2019		3.7800		18.3000
Conductivity	umhos/cm	G-09S	04/23/2019		920.0000	***	540.0000
Dissolved antimony	mg/L	G-09S	04/23/2019	ND	0.0003		0.0019
Dissolved arsenic	mg/L	G-09S	04/23/2019		0.0008		0.0040
Dissolved barium	mg/L	G-09S	04/23/2019		0.0065		3.9122
Dissolved beryllium	mg/L	G-09S	04/23/2019	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-09S	04/23/2019		0.0001		0.0010
Dissolved calcium	mg/L	G-09S	04/23/2019		102.0000	***	23.8314
Dissolved chromium	mg/L	G-09S	04/23/2019	ND	0.0050		0.0150
Dissolved cobalt	mg/L	G-09S	04/23/2019	ND	0.0050		0.0030
Dissolved copper	mg/L	G-09S	04/23/2019	ND	0.0050		0.1150
Dissolved iron	mg/L	G-09S	04/23/2019		11.2000		12.9457
Dissolved lead	mg/L	G-09S	04/23/2019	ND	0.0001		0.0027
Dissolved magnesium	mg/L	G-09S	04/23/2019		23.7000		55.5098
Dissolved manganese	mg/L	G-09S	04/23/2019		3.3190		4.7921
Dissolved nickel	mg/L	G-09S	04/23/2019		0.0070		0.0380
Dissolved potassium	mg/L	G-09S	04/23/2019		3.6800	***	2.7105
Dissolved selenium	mg/L	G-09S	04/23/2019		0.0010	**	0.0020
Dissolved silver	mg/L	G-09S	04/23/2019	ND	0.0001		0.0002
Dissolved sodium	mg/L	G-09S	04/23/2019		195.0000	*	125.7257
Dissolved thallium	mg/L	G-09S	04/23/2019	ND	0.0001		0.0030
Dissolved vanadium	mg/L	G-09S	04/23/2019	ND	0.0100		0.0100
Dissolved zinc	mg/L	G-09S	04/23/2019	ND	0.0050		0.0300
Nitrate nitrogen	mg-N/L	G-09S	04/23/2019	ND	0.0100		2.3688
Nitrite nitrogen	mg-N/L	G-09S	04/23/2019	ND	0.0020		24.6700
pH	std units	G-09S	04/23/2019		6.2700		5.74 - 10.17
Sulfate	mg/L	G-09S	04/23/2019		201.0000		288.1075
Total dissolved solids	mg/L	G-09S	04/23/2019		660.0000	***	404.1141
Total organic carbon	mg/L	G-09S	04/23/2019		6.8000		22.0000
Alkalinity (as cacO3)	mg/L	G-10S	04/23/2019		410.0000	***	200.0000
Ammonia nitrogen	mg-N/L	G-10S	04/23/2019		0.2490		15.5283

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result		Pred. Limit
Bicarbonate	mg/L	G-10S	04/23/2019		410.0000	***	200.0000
Chemical oxygen demand	mg/L	G-10S	04/23/2019	ND	10.0000		28.0000
Chloride	mg/L	G-10S	04/23/2019		8.9200		18.3000
Conductivity	umhos/cm	G-10S	04/23/2019		1300.0000	***	540.0000
Dissolved antimony	mg/L	G-10S	04/23/2019	ND	0.0003		0.0019
Dissolved arsenic	mg/L	G-10S	04/23/2019		0.0058	***	0.0040
Dissolved barium	mg/L	G-10S	04/23/2019		0.0065		3.9122
Dissolved beryllium	mg/L	G-10S	04/23/2019	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-10S	04/23/2019	ND	0.0001		0.0010
Dissolved calcium	mg/L	G-10S	04/23/2019		96.6000	***	23.8314
Dissolved chromium	mg/L	G-10S	04/23/2019	ND	0.0050		0.0150
Dissolved cobalt	mg/L	G-10S	04/23/2019	ND	0.0050		0.0030
Dissolved copper	mg/L	G-10S	04/23/2019	ND	0.0050		0.1150
Dissolved iron	mg/L	G-10S	04/23/2019		11.2000		12.9457
Dissolved lead	mg/L	G-10S	04/23/2019	ND	0.0001		0.0027
Dissolved magnesium	mg/L	G-10S	04/23/2019		23.7000		55.5098
Dissolved manganese	mg/L	G-10S	04/23/2019		3.3200		4.7921
Dissolved nickel	mg/L	G-10S	04/23/2019		0.0070		0.0380
Dissolved potassium	mg/L	G-10S	04/23/2019		3.6800	***	2.7105
Dissolved selenium	mg/L	G-10S	04/23/2019		0.0004		0.0020
Dissolved silver	mg/L	G-10S	04/23/2019	ND	0.0001		0.0002
Dissolved sodium	mg/L	G-10S	04/23/2019		195.0000	***	125.7257
Dissolved thallium	mg/L	G-10S	04/23/2019	ND	0.0001		0.0030
Dissolved vanadium	mg/L	G-10S	04/23/2019	ND	0.0100		0.0100
Dissolved zinc	mg/L	G-10S	04/23/2019	ND	0.0050		0.0300
Nitrate nitrogen	mg-N/L	G-10S	04/23/2019	ND	0.0100		2.3688
Nitrite nitrogen	mg-N/L	G-10S	04/23/2019	ND	0.0020		24.6700
pH	std units	G-10S	04/23/2019		6.5700		5.74 - 10.17
Sulfate	mg/L	G-10S	04/23/2019		283.0000	**	288.1075
Total dissolved solids	mg/L	G-10S	04/23/2019		980.0000	***	404.1141
Total organic carbon	mg/L	G-10S	04/23/2019		4.9000		22.0000
Alkalinity (as cacO3)	mg/L	G-11S	04/24/2019		80.0000		200.0000
Ammonia nitrogen	mg-N/L	G-11S	04/24/2019	ND	0.0200		15.5283
Bicarbonate	mg/L	G-11S	04/24/2019		80.0000		200.0000
Chemical oxygen demand	mg/L	G-11S	04/24/2019	ND	10.0000		28.0000
Chloride	mg/L	G-11S	04/24/2019		2.3500		18.3000
Conductivity	umhos/cm	G-11S	04/24/2019		220.0000		540.0000
Dissolved antimony	mg/L	G-11S	04/24/2019	ND	0.0003		0.0019
Dissolved arsenic	mg/L	G-11S	04/24/2019		0.0007		0.0040
Dissolved barium	mg/L	G-11S	04/24/2019		0.0013		3.9122
Dissolved beryllium	mg/L	G-11S	04/24/2019	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-11S	04/24/2019	ND	0.0001		0.0010
Dissolved calcium	mg/L	G-11S	04/24/2019		7.0300		23.8314
Dissolved chromium	mg/L	G-11S	04/24/2019	ND	0.0050		0.0150
Dissolved cobalt	mg/L	G-11S	04/24/2019	ND	0.0050		0.0030
Dissolved copper	mg/L	G-11S	04/24/2019		0.0060		0.1150
Dissolved iron	mg/L	G-11S	04/24/2019	ND	0.0100		12.9457
Dissolved lead	mg/L	G-11S	04/24/2019	ND	0.0001		0.0027
Dissolved magnesium	mg/L	G-11S	04/24/2019		1.4600		55.5098
Dissolved manganese	mg/L	G-11S	04/24/2019		0.0179		4.7921
Dissolved nickel	mg/L	G-11S	04/24/2019		0.0060		0.0380
Dissolved potassium	mg/L	G-11S	04/24/2019		0.6600		2.7105
Dissolved selenium	mg/L	G-11S	04/24/2019	ND	0.0003		0.0020
Dissolved silver	mg/L	G-11S	04/24/2019	ND	0.0001		0.0002
Dissolved sodium	mg/L	G-11S	04/24/2019		50.1000		125.7257
Dissolved thallium	mg/L	G-11S	04/24/2019	ND	0.0001		0.0030
Dissolved vanadium	mg/L	G-11S	04/24/2019	ND	0.0100		0.0100
Dissolved zinc	mg/L	G-11S	04/24/2019	ND	0.0050		0.0300
Nitrate nitrogen	mg-N/L	G-11S	04/24/2019	ND	0.0100		2.3688
Nitrite nitrogen	mg-N/L	G-11S	04/24/2019	ND	0.0020		24.6700
pH	std units	G-11S	04/24/2019		6.7600		5.74 - 10.17
Sulfate	mg/L	G-11S	04/24/2019		33.4000		288.1075
Total dissolved solids	mg/L	G-11S	04/24/2019		170.0000		404.1141

Table 2**Most Current Downgradient Monitoring Data**

Constituent	Units	Well	Date	Result	Pred. Limit
Total organic carbon	mg/L	G-11S	04/24/2019	3.2000	22.0000

- * - Current value failed - awaiting verification.
 - ** - Current value passed - previous exceedance not verified.
 - *** - Current value failed - exceedance verified.
 - **** - Current value passed - awaiting one more verification.
 - ***** - Insufficient background data to compute prediction limit.
- ND = Not Detected, Result = detection limit.

Table 5

Summary Statistics and Prediction Limits

Constituent	Units	Detect	N	Mean	SD	alpha	Factor	Pred Limit	Type		Conf
Alkalinity (as cacO ₃)	mg/L	79	79					200.0000	nonpar		0.99
Ammonia nitrogen	mg-N/L	42	75	-2.1522	2.0450	0.0100	2.3936	15.5283	lognor		
Bicarbonate	mg/L	79	79					200.0000	nonpar		0.99
Chemical oxygen demand	mg/L	10	79					28.0000	nonpar		0.99
Chloride	mg/L	78	79					18.3000	nonpar		0.99
Conductivity	umhos/cm	78	78					540.0000	nonpar		0.99
Dissolved antimony	mg/L	34	79					0.0019	nonpar		0.99
Dissolved arsenic	mg/L	70	74					0.0040	nonpar		0.99
Dissolved barium	mg/L	57	72	-4.5594	2.4718	0.0100	2.3965	3.9122	lognor		
Dissolved beryllium	mg/L	0	79					0.0005	nonpar	***	0.99
Dissolved cadmium	mg/L	35	74					0.0010	nonpar		0.99
Dissolved calcium	mg/L	77	77	7.2100	6.9494	0.0100	2.3918	23.8314	normal		
Dissolved chromium	mg/L	29	77					0.0150	nonpar		0.99
Dissolved cobalt	mg/L	5	78					0.0030	nonpar		0.99
Dissolved copper	mg/L	40	75					0.1150	nonpar		0.99
Dissolved iron	mg/L	48	76	-1.8700	1.8518	0.0100	2.3927	12.9457	lognor		
Dissolved lead	mg/L	33	79					0.0027	nonpar		0.99
Dissolved magnesium	mg/L	65	75	-0.0911	1.7161	0.0100	2.3936	55.5098	lognor		
Dissolved manganese	mg/L	56	72	-4.1488	2.3851	0.0100	2.3965	4.7921	lognor		
Dissolved nickel	mg/L	20	77					0.0380	nonpar		0.99
Dissolved potassium	mg/L	75	77	-0.7201	0.7180	0.0100	2.3918	2.7105	lognor		
Dissolved selenium	mg/L	6	78					0.0020	nonpar		0.99
Dissolved silver	mg/L	4	73					0.0002	nonpar		0.99
Dissolved sodium	mg/L	77	77	89.5260	15.1350	0.0100	2.3918	125.7257	normal		
Dissolved thallium	mg/L	6	78					0.0030	nonpar		0.99
Dissolved vanadium	mg/L	2	79					0.0100	nonpar		0.99
Dissolved zinc	mg/L	33	78					0.0300	nonpar		0.99
Nitrate nitrogen	mg-N/L	71	76	-2.0424	1.2140	0.0100	2.3927	2.3688	lognor		
Nitrite nitrogen	mg-N/L	44	71	-3.4630	2.7815	0.0100	2.3975	24.6700	lognor		
pH	std units	79	79	7.9510	0.8338	0.0100	2.6570	5.74 - 10.17	normal		
Sulfate	mg/L	78	78	3.8686	0.7506	0.0100	2.3909	288.1075	lognor		
Total dissolved solids	mg/L	79	79	283.7975	50.3400	0.0100	2.3901	404.1141	normal		
Total organic carbon	mg/L	70	79					22.0000	nonpar		0.99

Conf = confidence level for passing initial test or one of two verification resamples at all downgradient wells for a single constituent (nonparametric test only).

* - Insufficient Data.

** - Calculated limit raised to Manual Reporting Limit.

*** - Nonparametric limit based on ND value.

For transformed data, mean and SD in transformed units and prediction limit in original units.

All sample sizes and statistics are based on outlier free data.

For nonparametric limits, median reporting limits are substituted for extreme reporting limit values.

Groundwater Analytical Summary - Shallow Wells: Third Quarter 2019
Cathcart Landfill, Snohomish County, WA

	Statistical Method	Number of Samples	Number of Detects	Prediction Limit	Primary GW Stds 173-200	G-09S					G-10S					
						7/30/19	D	V	Tr	Ch	7/30/19	D	V	Tr	Ch	
CONVENTIONAL CHEMISTRY PARAMETERS (mg/L)																
Alkalinity (as CaCO3)	nonpar	77	77	200	--	360		V	I	N	420		V			
Ammonia Nitrogen	lognor	73	42	15.5283	--	0.02	U				0.232					
Bicarbonate	nonpar	77	77	200	--	360		V	I	N	420		V			
Calcium, Dissolved	normal	75	75	23.8314	--	77.9		V	D	N	107		V	D	N	
Chemical Oxygen Demand	nonpar	77	10	28	--	12		E			10	U				
Chloride	nonpar	77	76	18.3	250	18.8		V	D	N	16.5			D	N	
Conductivity (umhos/cm)	nonpar	76	76	540	700	970		V			1400		V			
Magnesium, Dissolved	lognor	73	64	55.5098	--	28.3			D	N	24.4			D	N	
Nitrate Nitrogen (mg-N/L)	lognor	74	69	2.3688	10	0.01	U			Y	0.01	U				
Nitrite Nitrogen (mg-N/L)	lognor	69	43	24.67	1	0.002	U				0.002	U				
pH (std units)	normal	77	77	5.74-10.17	6.5-8.5	6.22					6.61					
Potassium, Dissolved	lognor	75	74	2.7105	--	4.72		V			3.60		V			
Sodium, Dissolved	normal	75	75	125.7257	20	82.1		P	D	N	174		V	D	Y	
Sulfate	normal	76	76	288.1075	250	164		V			279		E			
Total Dissolved Solids	normal	77	77	404.1141	500	670		V			970		V			
Total Organic Carbon	nonpar	77	68	22	--	4.5					4.3			D	Y	
DISSOLVED METALS EPA Methods 200.7/200.8 (mg/L)																
Antimony	nonpar	77	34	0.0019	0.006	0.0003	U				0.0003	U				
Arsenic	nonpar	72	68	0.004	0.00005	0.000652				Y	0.00645		V	I	N	
Barium	lognor	70	55	3.9122	1	0.0005	U				0.0058					
Beryllium	nonpar	77	0	0.0005	0.004	0.0005	U				0.0005	U				
Cadmium	nonpar	72	35	0.001	0.005	0.00005	U				0.00005	U				
Chromium	nonpar	75	28	0.015	0.05	0.005	U				0.005	U				
Cobalt	nonpar	76	5	0.003	--	0.005	U				0.005	U				
Copper	nonpar	73	39	0.115	1	0.008					0.005	U				
Iron	lognor	74	46	12.9457	0.3	0.033					12.0					
Lead	nonpar	77	33	0.0027	0.05	0.00017					0.0001	U				
Manganese	lognor	70	55	4.7921	0.05	0.0425					3.289			D	Y	
Nickel	nonpar	75	19	0.038	0.1	0.019					0.007					
Selenium	nonpar	76	6	0.002	0.01	0.0003	U				0.0003	U				
Silver	nonpar	71	4	0.0002	0.05	0.0001	U				0.0001	U				
Thallium	nonpar	76	6	0.003	0.002	0.00005	U				0.00005	U				
Vanadium	nonpar	77	2	0.01	--	0.01	U				0.01	U				
Zinc	nonpar	76	33	0.03	5	0.005	U				0.005	U				
TOTAL METALS EPA Methods 200.7/200.8 (mg/L)																
Antimony					0.006	0.0003	U				0.0003	U				
Arsenic					0.00005	0.00095					0.00568					
Barium					1	0.0064					0.005	U				
Beryllium					0.004	0.0005	U				0.0005	U				
Cadmium					0.005	0.00005	U				0.00005	U				
Chromium					0.05	0.005	U				0.005	U				
Cobalt					--	0.005	U				0.005	U				
Copper					1	0.005					0.005	U				
Iron					0.3	0.938					12.1					
Lead					0.05	0.00119					0.0001	U				
Manganese					0.05	0.0897					3.43					
Nickel					0.1	0.026					0.007					
Selenium					0.01	0.0003	U				0.0003	U				
Silver					0.05	0.0023					0.0001	U				
Thallium					0.002	0.00005	U				0.00005	U				
Vanadium					--	0.01	U				0.01	U				
Zinc					5	0.0062					0.005	U				
VOLATILE ORGANIC COMPOUNDS (VOCs) EPA Method 8260 (µg/L)																
1,1,1-Trichloroethane					200	1	U				1	U				
1,1,2,2-Tetrachloroethane					--	1	U				1	U				
1,1,2-Trichloroethane					--	1	U				1	U				
1,1-Dichloroethane					1	1	U				1	U				
1,1-Dichloroethylene					--	1	U				1	U				
1,2,3-Trichloropropane					--	1	U				1	U				
1,2-Dibromo-3-chloropropane					0.2	0.01	U				0.01	U				
1,2-Dibromoethane					0.001	0.01	U				0.01	U				
1,2-Dichlorobenzene					--	1	U				1	U				

**Groundwater Analytical Summary - Shallow Wells: Third Quarter 2019
Cathcart Landfill, Snohomish County, WA**

	Statistical Method	Number of Samples	Number of Detects	Prediction Limit	Primary GW Stds 173-200	G-09S					G-10S					
						7/30/19	D	V	Tr	Ch	7/30/19	D	V	Tr	Ch	
VOLATILE ORGANIC COMPOUNDS (VOCs) EPA Method 8260 (µg/L) (cont.)																
1,2-Dichloroethane					0.5	0.5	U				0.5	U				
1,2-Dichloropropane					0.6	0.6	U				0.6	U				
1,4-Dichlorobenzene					4	1	U				1	U				
2-Butanone					--	5	U				5	U				
2-Hexanone					--	5	U				5	U				
4-Methyl-2-Pentanone (MIBK)					--	5	U				5	U				
Acetone					--	5	U				5	U				
Acrylonitrile					0.07	0.01	U				0.01	U				
Benzene					1	1	U				1	U				
Bromodichloromethane					0.3	0.3	U				0.3	U				
Bromoform					5	1	U				1	U				
Bromomethane					--	1	U				1	U				
Carbon Disulfide					--	1	U				1	U				
Carbon Tetrachloride					0.3	0.3	U				0.3	U				
Chlorobenzene					--	0.2	U				0.2	U				
Chlorodibromomethane					0.5	0.5	U				0.5	U				
Chloroethane					--	1	U				1	U				
Chloroform					7	1	U				1	U				
Chloromethane					--	1	U				1	U				
cis-1,2-Dichloroethene					--	0.2	U				0.2	U				
cis-1,3-Dichloropropene					0.2	0.2	U				0.2	U				
Dibromomethane					--	0.01	U				0.01	U				
Ethyl Benzene					--	1	U				1	U				
m,p-Xylene					--	1	U				1	U				
Methyl Iodide					--	1	U				1	U				
Methylene Chloride					5	2	U				2	U				
o-Xylene					--	1	U				1	U				
Styrene					--	1	U				1	U				
Tetrachloroethylene					0.8	0.8	U				0.8	U				
Toluene					--	1	U				1	U				
trans-1,2-Dichloroethene					--	1	U				1	U				
trans-1,3-Dichloropropene					0.2	0.2	U				0.2	U				
trans-1,4-Dichloro-2-butene					--	5	U				5	U				
Trichlorethene (1,1,2-Trichloroethylene)					3	1	U				1	U				
Trichlorofluoromethane					--	1	U				1	U				
Vinyl Acetate					--	5	U				5	U				
Vinyl Chloride					0.02	0.01	U				0.01	U				

D: U = Indicates compound was not detected at the given reporting limit; X indicates that the compound was detected in the trip blank and contamination is suspected.
V: E= Exceedance, waiting verification based on subsequent lab data; V= Exceedance verified based on previous lab data; P=Passed, previous exceedance not verified based on current lab data.
Tr: I=increasing Trend, D=Decreasing Trend;
Ch: Y indicates a change in trend from previous quarter; N means no change in trend.
Values in purple exceed the prediction limit; indicates that a value exceeded the Groundwater Standards
The groundwater standards listed are based on the Washington Administrative Code (WAC) 173-200 groundwater limits as modified by the TMS 91-11 standards - the most restrictive of the two is used.
X = Methylene chloride was measured in the trip blank, but not in the lab blank - contaminations during transport is suspected.

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result		Pred. Limit
Alkalinity (as cacO ₃)	mg/L	G-01A	04/24/2019		18.0000		200.0000
Ammonia nitrogen	mg-N/L	G-01A	04/24/2019	ND	0.0200		15.5283
Bicarbonate	mg/L	G-01A	04/24/2019		18.0000		200.0000
Chemical oxygen demand	mg/L	G-01A	04/24/2019	ND	10.0000		28.0000
Chloride	mg/L	G-01A	04/24/2019		0.0800		18.3000
Conductivity	umhos/cm	G-01A	04/24/2019		110.0000		540.0000
Dissolved antimony	mg/L	G-01A	04/24/2019	ND	0.0003		0.0019
Dissolved arsenic	mg/L	G-01A	04/24/2019		0.0002		0.0040
Dissolved barium	mg/L	G-01A	04/24/2019		0.0016		3.9122
Dissolved beryllium	mg/L	G-01A	04/24/2019	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-01A	04/24/2019	ND	0.0001		0.0010
Dissolved calcium	mg/L	G-01A	04/24/2019		9.9000		23.8314
Dissolved chromium	mg/L	G-01A	04/24/2019	ND	0.0050		0.0150
Dissolved cobalt	mg/L	G-01A	04/24/2019	ND	0.0050		0.0030
Dissolved copper	mg/L	G-01A	04/24/2019		0.0090		0.1150
Dissolved iron	mg/L	G-01A	04/24/2019	ND	0.0100		12.9457
Dissolved lead	mg/L	G-01A	04/24/2019	ND	0.0001		0.0027
Dissolved magnesium	mg/L	G-01A	04/24/2019		2.8600		55.5098
Dissolved manganese	mg/L	G-01A	04/24/2019	ND	0.0050		4.7921
Dissolved nickel	mg/L	G-01A	04/24/2019	ND	0.0050		0.0380
Dissolved potassium	mg/L	G-01A	04/24/2019		0.5800		2.7105
Dissolved selenium	mg/L	G-01A	04/24/2019	ND	0.0003		0.0020
Dissolved silver	mg/L	G-01A	04/24/2019	ND	0.0001		0.0002
Dissolved sodium	mg/L	G-01A	04/24/2019		4.2100		125.7257
Dissolved thallium	mg/L	G-01A	04/24/2019	ND	0.0001		0.0030
Dissolved thallium	mg/L	G-01A	04/24/2019	ND	0.0100		0.0100
Dissolved zinc	mg/L	G-01A	04/24/2019		0.0060		0.0300
Nitrate nitrogen	mg-N/L	G-01A	04/24/2019		0.0590		2.3688
Nitrite nitrogen	mg-N/L	G-01A	04/24/2019		0.0020		24.6700
pH	std units	G-01A	04/24/2019		6.1400	**	5.74 - 10.17
Sulfate	mg/L	G-01A	04/24/2019		27.9000		288.1075
Total dissolved solids	mg/L	G-01A	04/24/2019		100.0000		404.1141
Total organic carbon	mg/L	G-01A	04/24/2019		4.5000		22.0000
Alkalinity (as cacO ₃)	mg/L	G-04A	04/24/2019		260.0000	*	200.0000
Ammonia nitrogen	mg-N/L	G-04A	04/24/2019		0.0340		15.5283
Bicarbonate	mg/L	G-04A	04/24/2019		260.0000	*	200.0000
Chemical oxygen demand	mg/L	G-04A	04/24/2019	ND	10.0000	**	28.0000
Chloride	mg/L	G-04A	04/24/2019		8.0500		18.3000
Conductivity	umhos/cm	G-04A	04/24/2019		680.0000	*	540.0000
Dissolved antimony	mg/L	G-04A	04/24/2019	ND	0.0003		0.0019
Dissolved arsenic	mg/L	G-04A	04/24/2019		0.0034	**	0.0040
Dissolved barium	mg/L	G-04A	04/24/2019	ND	0.0005		3.9122
Dissolved beryllium	mg/L	G-04A	04/24/2019	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-04A	04/24/2019	ND	0.0001		0.0010
Dissolved calcium	mg/L	G-04A	04/24/2019		1.0200	**	23.8314
Dissolved chromium	mg/L	G-04A	04/24/2019	ND	0.0050		0.0150
Dissolved cobalt	mg/L	G-04A	04/24/2019	ND	0.0050		0.0030
Dissolved copper	mg/L	G-04A	04/24/2019	ND	0.0050		0.1150
Dissolved iron	mg/L	G-04A	04/24/2019		0.0140	**	12.9457
Dissolved lead	mg/L	G-04A	04/24/2019	ND	0.0001		0.0027
Dissolved magnesium	mg/L	G-04A	04/24/2019	ND	0.2000		55.5098
Dissolved manganese	mg/L	G-04A	04/24/2019	ND	0.0050	**	4.7921
Dissolved nickel	mg/L	G-04A	04/24/2019		0.0060		0.0380
Dissolved potassium	mg/L	G-04A	04/24/2019		0.3000		2.7105
Dissolved selenium	mg/L	G-04A	04/24/2019		0.0003		0.0020
Dissolved silver	mg/L	G-04A	04/24/2019	ND	0.0001		0.0002
Dissolved sodium	mg/L	G-04A	04/24/2019		182.0000	*	125.7257
Dissolved thallium	mg/L	G-04A	04/24/2019	ND	0.0001		0.0030
Dissolved vanadium	mg/L	G-04A	04/24/2019	ND	0.0100		0.0100
Dissolved zinc	mg/L	G-04A	04/24/2019	ND	0.0050		0.0300
Nitrate nitrogen	mg-N/L	G-04A	04/24/2019		0.1500		2.3688
Nitrite nitrogen	mg-N/L	G-04A	04/24/2019		0.0080		24.6700
pH	std units	G-04A	04/24/2019		6.0900		5.74 - 10.17
Sulfate	mg/L	G-04A	04/24/2019		82.9000		288.1075
Total dissolved solids	mg/L	G-04A	04/24/2019		450.0000	*	404.1141
Total organic carbon	mg/L	G-04A	04/24/2019		45.0000	*	22.0000
Alkalinity (as cacO ₃)	mg/L	G-08D1	04/23/2019		160.0000		200.0000

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result		Pred. Limit
Ammonia nitrogen	mg-N/L	G-08D1	04/23/2019		0.0810		15.5283
Bicarbonate	mg/L	G-08D1	04/23/2019		150.0000		200.0000
Chemical oxygen demand	mg/L	G-08D1	04/23/2019	ND	10.0000		28.0000
Chloride	mg/L	G-08D1	04/23/2019		2.8800		18.3000
Conductivity	umhos/cm	G-08D1	04/23/2019		390.0000		540.0000
Dissolved antimony	mg/L	G-08D1	04/23/2019	ND	0.0003		0.0019
Dissolved arsenic	mg/L	G-08D1	04/23/2019		0.0013		0.0040
Dissolved barium	mg/L	G-08D1	04/23/2019		0.0056		3.9122
Dissolved beryllium	mg/L	G-08D1	04/23/2019	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-08D1	04/23/2019	ND	0.0001		0.0010
Dissolved calcium	mg/L	G-08D1	04/23/2019		0.9000		23.8314
Dissolved chromium	mg/L	G-08D1	04/23/2019	ND	0.0050		0.0150
Dissolved cobalt	mg/L	G-08D1	04/23/2019	ND	0.0050		0.0030
Dissolved copper	mg/L	G-08D1	04/23/2019	ND	0.0050		0.1150
Dissolved iron	mg/L	G-08D1	04/23/2019		1.3900		12.9457
Dissolved lead	mg/L	G-08D1	04/23/2019		0.0004		0.0027
Dissolved magnesium	mg/L	G-08D1	04/23/2019		0.4800		55.5098
Dissolved manganese	mg/L	G-08D1	04/23/2019		0.0260		4.7921
Dissolved nickel	mg/L	G-08D1	04/23/2019		0.0050		0.0380
Dissolved potassium	mg/L	G-08D1	04/23/2019		0.4100		2.7105
Dissolved selenium	mg/L	G-08D1	04/23/2019	ND	0.0003		0.0020
Dissolved silver	mg/L	G-08D1	04/23/2019	ND	0.0001		0.0002
Dissolved sodium	mg/L	G-08D1	04/23/2019		109.0000		125.7257
Dissolved thallium	mg/L	G-08D1	04/23/2019	ND	0.0001		0.0030
Dissolved vanadium	mg/L	G-08D1	04/23/2019	ND	0.0100		0.0100
Dissolved zinc	mg/L	G-08D1	04/23/2019	ND	0.0050		0.0300
Nitrate nitrogen	mg-N/L	G-08D1	04/23/2019		0.1100		2.3688
Nitrite nitrogen	mg-N/L	G-08D1	04/23/2019		0.0020		24.6700
pH	std units	G-08D1	04/23/2019		9.6800		5.74 - 10.17
Sulfate	mg/L	G-08D1	04/23/2019		48.4000		288.1075
Total dissolved solids	mg/L	G-08D1	04/23/2019		290.0000		404.1141
Total organic carbon	mg/L	G-08D1	04/23/2019		3.2000		22.0000
Alkalinity (as cacO3)	mg/L	G-09S	07/30/2019		360.0000	***	200.0000
Ammonia nitrogen	mg-N/L	G-09S	07/30/2019	ND	0.0200		15.5283
Bicarbonate	mg/L	G-09S	07/30/2019		360.0000	***	200.0000
Chemical oxygen demand	mg/L	G-09S	07/30/2019		12.0000		28.0000
Chloride	mg/L	G-09S	07/30/2019		18.8000	*	18.3000
Conductivity	umhos/cm	G-09S	07/30/2019		970.0000	***	540.0000
Dissolved antimony	mg/L	G-09S	07/30/2019	ND	0.0003		0.0019
Dissolved arsenic	mg/L	G-09S	07/30/2019		0.0007		0.0040
Dissolved barium	mg/L	G-09S	07/30/2019	ND	0.0005		3.9122
Dissolved beryllium	mg/L	G-09S	07/30/2019	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-09S	07/30/2019	ND	0.0001		0.0010
Dissolved calcium	mg/L	G-09S	07/30/2019		77.9000	***	23.8314
Dissolved chromium	mg/L	G-09S	07/30/2019	ND	0.0050		0.0150
Dissolved cobalt	mg/L	G-09S	07/30/2019	ND	0.0050		0.0030
Dissolved copper	mg/L	G-09S	07/30/2019		0.0080		0.1150
Dissolved iron	mg/L	G-09S	07/30/2019		0.0330		12.9457
Dissolved lead	mg/L	G-09S	07/30/2019		0.0002		0.0027
Dissolved magnesium	mg/L	G-09S	07/30/2019		28.3000		55.5098
Dissolved manganese	mg/L	G-09S	07/30/2019		0.0425		4.7921
Dissolved nickel	mg/L	G-09S	07/30/2019		0.0190		0.0380
Dissolved potassium	mg/L	G-09S	07/30/2019		4.7200	***	2.7105
Dissolved selenium	mg/L	G-09S	07/30/2019	ND	0.0003		0.0020
Dissolved silver	mg/L	G-09S	07/30/2019	ND	0.0001		0.0002
Dissolved sodium	mg/L	G-09S	07/30/2019		82.1000	**	125.7257
Dissolved thallium	mg/L	G-09S	07/30/2019	ND	0.0001		0.0030
Dissolved vanadium	mg/L	G-09S	07/30/2019	ND	0.0100		0.0100
Dissolved zinc	mg/L	G-09S	07/30/2019	ND	0.0050		0.0300
Nitrate nitrogen	mg-N/L	G-09S	07/30/2019	ND	0.0100		2.3688
Nitrite nitrogen	mg-N/L	G-09S	07/30/2019	ND	0.0020		24.6700
pH	std units	G-09S	07/30/2019		6.2200		5.74 - 10.17
Sulfate	mg/L	G-09S	07/30/2019		164.0000		288.1075
Total dissolved solids	mg/L	G-09S	07/30/2019		670.0000	***	404.1141
Total organic carbon	mg/L	G-09S	07/30/2019		4.5000		22.0000
Alkalinity (as cacO3)	mg/L	G-10S	07/30/2019		420.0000	***	200.0000
Ammonia nitrogen	mg-N/L	G-10S	07/30/2019		0.2320		15.5283

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result		Pred. Limit
Bicarbonate	mg/L	G-10S	07/30/2019		420.0000	***	200.0000
Chemical oxygen demand	mg/L	G-10S	07/30/2019	ND	10.0000		28.0000
Chloride	mg/L	G-10S	07/30/2019		16.5000		18.3000
Conductivity	umhos/cm	G-10S	07/30/2019		1400.0000	***	540.0000
Dissolved antimony	mg/L	G-10S	07/30/2019	ND	0.0003		0.0019
Dissolved arsenic	mg/L	G-10S	07/30/2019		0.0065	***	0.0040
Dissolved barium	mg/L	G-10S	07/30/2019		0.0058		3.9122
Dissolved beryllium	mg/L	G-10S	07/30/2019	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-10S	07/30/2019	ND	0.0001		0.0010
Dissolved calcium	mg/L	G-10S	07/30/2019		107.0000	***	23.8314
Dissolved chromium	mg/L	G-10S	07/30/2019	ND	0.0050		0.0150
Dissolved cobalt	mg/L	G-10S	07/30/2019	ND	0.0050		0.0030
Dissolved copper	mg/L	G-10S	07/30/2019	ND	0.0050		0.1150
Dissolved iron	mg/L	G-10S	07/30/2019		12.0000		12.9457
Dissolved lead	mg/L	G-10S	07/30/2019	ND	0.0001		0.0027
Dissolved magnesium	mg/L	G-10S	07/30/2019		24.4000		55.5098
Dissolved manganese	mg/L	G-10S	07/30/2019		3.2890		4.7921
Dissolved nickel	mg/L	G-10S	07/30/2019		0.0070		0.0380
Dissolved potassium	mg/L	G-10S	07/30/2019		3.6000	***	2.7105
Dissolved selenium	mg/L	G-10S	07/30/2019	ND	0.0003		0.0020
Dissolved silver	mg/L	G-10S	07/30/2019	ND	0.0001		0.0002
Dissolved sodium	mg/L	G-10S	07/30/2019		174.0000	***	125.7257
Dissolved thallium	mg/L	G-10S	07/30/2019	ND	0.0001		0.0030
Dissolved vanadium	mg/L	G-10S	07/30/2019	ND	0.0100		0.0100
Dissolved zinc	mg/L	G-10S	07/30/2019	ND	0.0050		0.0300
Nitrate nitrogen	mg-N/L	G-10S	07/30/2019	ND	0.0100		2.3688
Nitrite nitrogen	mg-N/L	G-10S	07/30/2019	ND	0.0020		24.6700
pH	std units	G-10S	07/30/2019		6.6100		5.74 - 10.17
Sulfate	mg/L	G-10S	07/30/2019		279.0000		288.1075
Total dissolved solids	mg/L	G-10S	07/30/2019		970.0000	***	404.1141
Total organic carbon	mg/L	G-10S	07/30/2019		4.3000		22.0000
Alkalinity (as cacO3)	mg/L	G-11S	04/24/2019		80.0000		200.0000
Ammonia nitrogen	mg-N/L	G-11S	04/24/2019	ND	0.0200		15.5283
Bicarbonate	mg/L	G-11S	04/24/2019		80.0000		200.0000
Chemical oxygen demand	mg/L	G-11S	04/24/2019	ND	10.0000		28.0000
Chloride	mg/L	G-11S	04/24/2019		2.3500		18.3000
Conductivity	umhos/cm	G-11S	04/24/2019		220.0000		540.0000
Dissolved antimony	mg/L	G-11S	04/24/2019	ND	0.0003		0.0019
Dissolved arsenic	mg/L	G-11S	04/24/2019		0.0007		0.0040
Dissolved barium	mg/L	G-11S	04/24/2019		0.0013		3.9122
Dissolved beryllium	mg/L	G-11S	04/24/2019	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-11S	04/24/2019	ND	0.0001		0.0010
Dissolved calcium	mg/L	G-11S	04/24/2019		7.0300		23.8314
Dissolved chromium	mg/L	G-11S	04/24/2019	ND	0.0050		0.0150
Dissolved cobalt	mg/L	G-11S	04/24/2019	ND	0.0050		0.0030
Dissolved copper	mg/L	G-11S	04/24/2019		0.0060		0.1150
Dissolved iron	mg/L	G-11S	04/24/2019	ND	0.0100		12.9457
Dissolved lead	mg/L	G-11S	04/24/2019	ND	0.0001		0.0027
Dissolved magnesium	mg/L	G-11S	04/24/2019		1.4600		55.5098
Dissolved manganese	mg/L	G-11S	04/24/2019		0.0179		4.7921
Dissolved nickel	mg/L	G-11S	04/24/2019		0.0060		0.0380
Dissolved potassium	mg/L	G-11S	04/24/2019		0.6600		2.7105
Dissolved selenium	mg/L	G-11S	04/24/2019	ND	0.0003		0.0020
Dissolved silver	mg/L	G-11S	04/24/2019	ND	0.0001		0.0002
Dissolved sodium	mg/L	G-11S	04/24/2019		50.1000		125.7257
Dissolved thallium	mg/L	G-11S	04/24/2019	ND	0.0001		0.0030
Dissolved vanadium	mg/L	G-11S	04/24/2019	ND	0.0100		0.0100
Dissolved zinc	mg/L	G-11S	04/24/2019	ND	0.0050		0.0300
Nitrate nitrogen	mg-N/L	G-11S	04/24/2019	ND	0.0100		2.3688
Nitrite nitrogen	mg-N/L	G-11S	04/24/2019	ND	0.0020		24.6700
pH	std units	G-11S	04/24/2019		6.7600		5.74 - 10.17
Sulfate	mg/L	G-11S	04/24/2019		33.4000		288.1075
Total dissolved solids	mg/L	G-11S	04/24/2019		170.0000		404.1141

Table 2**Most Current Downgradient Monitoring Data**

Constituent	Units	Well	Date	Result	Pred. Limit
Total organic carbon	mg/L	G-11S	04/24/2019	3.2000	22.0000

- * - Current value failed - awaiting verification.
 - ** - Current value passed - previous exceedance not verified.
 - *** - Current value failed - exceedance verified.
 - **** - Current value passed - awaiting one more verification.
 - ***** - Insufficient background data to compute prediction limit.
- ND = Not Detected, Result = detection limit.

Table 5

Summary Statistics and Prediction Limits

Constituent	Units	Detect	N	Mean	SD	alpha	Factor	Pred Limit	Type		Conf
Alkalinity (as cacO ₃)	mg/L	79	79					200.0000	nonpar		0.99
Ammonia nitrogen	mg-N/L	42	75	-2.1522	2.0450	0.0100	2.3936	15.5283	lognor		
Bicarbonate	mg/L	79	79					200.0000	nonpar		0.99
Chemical oxygen demand	mg/L	10	79					28.0000	nonpar		0.99
Chloride	mg/L	78	79					18.3000	nonpar		0.99
Conductivity	umhos/cm	78	78					540.0000	nonpar		0.99
Dissolved antimony	mg/L	34	79					0.0019	nonpar		0.99
Dissolved arsenic	mg/L	70	74					0.0040	nonpar		0.99
Dissolved barium	mg/L	57	72	-4.5594	2.4718	0.0100	2.3965	3.9122	lognor		
Dissolved beryllium	mg/L	0	79					0.0005	nonpar	***	0.99
Dissolved cadmium	mg/L	35	74					0.0010	nonpar		0.99
Dissolved calcium	mg/L	77	77	7.2100	6.9494	0.0100	2.3918	23.8314	normal		
Dissolved chromium	mg/L	29	77					0.0150	nonpar		0.99
Dissolved cobalt	mg/L	5	78					0.0030	nonpar		0.99
Dissolved copper	mg/L	40	75					0.1150	nonpar		0.99
Dissolved iron	mg/L	48	76	-1.8700	1.8518	0.0100	2.3927	12.9457	lognor		
Dissolved lead	mg/L	33	79					0.0027	nonpar		0.99
Dissolved magnesium	mg/L	65	75	-0.0911	1.7161	0.0100	2.3936	55.5098	lognor		
Dissolved manganese	mg/L	56	72	-4.1488	2.3851	0.0100	2.3965	4.7921	lognor		
Dissolved nickel	mg/L	20	77					0.0380	nonpar		0.99
Dissolved potassium	mg/L	75	77	-0.7201	0.7180	0.0100	2.3918	2.7105	lognor		
Dissolved selenium	mg/L	6	78					0.0020	nonpar		0.99
Dissolved silver	mg/L	4	73					0.0002	nonpar		0.99
Dissolved sodium	mg/L	77	77	89.5260	15.1350	0.0100	2.3918	125.7257	normal		
Dissolved thallium	mg/L	6	78					0.0030	nonpar		0.99
Dissolved vanadium	mg/L	2	79					0.0100	nonpar		0.99
Dissolved zinc	mg/L	33	78					0.0300	nonpar		0.99
Nitrate nitrogen	mg-N/L	71	76	-2.0424	1.2140	0.0100	2.3927	2.3688	lognor		
Nitrite nitrogen	mg-N/L	44	71	-3.4630	2.7815	0.0100	2.3975	24.6700	lognor		
pH	std units	79	79	7.9510	0.8338	0.0100	2.6570	5.74 - 10.17	normal		
Sulfate	mg/L	78	78	3.8686	0.7506	0.0100	2.3909	288.1075	lognor		
Total dissolved solids	mg/L	79	79	283.7975	50.3400	0.0100	2.3901	404.1141	normal		
Total organic carbon	mg/L	70	79					22.0000	nonpar		0.99

Conf = confidence level for passing initial test or one of two verification resamples at all downgradient wells for a single constituent (nonparametric test only).

* - Insufficient Data.

** - Calculated limit raised to Manual Reporting Limit.

*** - Nonparametric limit based on ND value.

For transformed data, mean and SD in transformed units and prediction limit in original units.

All sample sizes and statistics are based on outlier free data.

For nonparametric limits, median reporting limits are substituted for extreme reporting limit values.

Groundwater Analytical Summary - Shallow Wells: Fourth Quarter 2019
Cathcart Landfill, Snohomish County, WA

	Statistical Method	Number of Samples	Number of Detects	Prediction Limit	Primary GW Stds 173-200	Downgradient Wells												Upgradient Wells																												
						G-01A				G-04A				G-08D1				G-09S				G-10S				G-11S				G-14S				G-24S												
						10/23/19	D	V	Tr	Ch	10/22/19	D	V	Tr	Ch	10/22/19	D	V	Tr	Ch	10/23/19	D	V	Tr	Ch	10/23/19	D	V	Tr	Ch	10/22/19	D	V	Tr	Ch	10/22/19	D	V	Tr	Ch	10/23/19	D	V	Tr	Ch	
CONVENTIONAL CHEMISTRY PARAMETERS (mg/L)																																														
Alkalinity (as CaCO3)	nonpar	79	79	200	--	32					270		E			180					360		V	I	N	440		V			90			D	N	200					110					
Ammonia Nitrogen	lognor	75	42	15.5283	--	0.02	U				0.227					0.117					0.02	U				0.264				0.02	U				0.02					0.02	U					
Bicarbonate	nonpar	79	79	200	--	32					270		E			110					360		V	I	N	440		V			90			D	N	160					110					
Calcium, Dissolved	normal	77	77	23.8314	--	12.3					43.1		E			1.1			I	N	76		V	D	N	100		V	D	N	8.94					0.67			I	N	9.39					
Chemical Oxygen Demand	nonpar	79	10	28	--	26					41		E			10	U				29		E			21				10	U				15					10	U					
Chloride	nonpar	79	78	18.3	250	0.57					7.13			I	N	2.86				D	N	4.76			D	N	7.02			D	N	7.16				2.26			D	N	5.03					
Conductivity (umhos/cm)	nonpar	78	78	540	700	130					530		P			420					950		V			1400		V		260			D	N	390			D	N	420						
Magnesium, Dissolved	lognor	75	65	55.5098	--	3.35					24.7					0.26	3.35				28.0			D	Y	23.0			D	N	1.85				0.2	U				0.01	U		D	N	0.056	
Nitrate Nitrogen (mg-N/L)	lognor	76	71	2.3688	10	0.033			Y		0.01	U				0.03					0.01	U				0.01	U			0.01	U				0.01	U		D	N	0.002	U					
Nitrite Nitrogen (mg-N/L)	lognor	71	44	24.67	1	0.002	U				0.002	U				0.004			D	N	0.003				0.002	U			0.002	U				0.002	U				0.002	U			0.002	U		
pH (std units)	normal	79	79	5.74-10.17	6.5-8.5	6.23			Y		6.03					9.59					6.16				6.59				6.86				9.13			I	N	7.23					0.62			
Potassium, Dissolved	lognor	77	75	2.7105	--	1.03					2.18				I	N	0.37				4.41		V			3.38		V		0.88				0.2	U				0.2	U			Y	0.62		
Sodium, Dissolved	normal	77	77	125.7257	20	5.99			D	N	14.3		P			107					87		P	D	Y	186		V	D	Y	50.1			D	N	107			D	N	92.1					
Sulfate	lognor	78	78	288.1075	250	26.0					24.9					50.5					178				323		E		35.3			D	N	15.1			D	N	70.8							
Total Dissolved Solids	normal	79	79	404.1141	500	81					350		P			280					560		V	D	Y	930		V		140			D	N	230			D	Y	200						
Total Organic Carbon	nonpar	79	70	22	--	7.2					20.0		P			1.5			D	N	4.3				4.2			Y	2.7				2.1						0.83							
DISSOLVED METALS EPA Methods 200.7/200.8 (mg/L)																																														
Antimony	nonpar	79	34	0.0019	0.006	0.0003	U				0.0003	U				0.0003	U				0.0003	U				0.0003	U			0.0003	U				0.0003	U				0.0003	U					
Arsenic	nonpar	74	70	0.004	0.00005	0.000212					0.0215		E	I	Y	0.00208					0.000659				0.00604		V	I	N	0.000572				0.00344				0.000781			D	N				
Barium	lognor	72	57	3.9122	1	0.0018					0.0056					0.0039					0.0034				0.0066				0.0007				0.001			0.0005	U			0.0005	U			D	N	
Beryllium	nonpar	79	0	0.0005	0.004	0.0005	U				0.0005	U				0.0005	U				0.0005	U			0.0005	U			0.0005	U			0.0005	U				0.0005	U			0.0005	U			
Cadmium	nonpar	74	35	0.001	0.005	0.00005	U				0.00005	U				0.00005	U				0.00005	U			0.00005	U			0.00005	U			0.00005	U				0.00005	U			0.00005	U			
Chromium	nonpar	77	29	0.015	0.05	0.005	U				0.0114					0.005	U				0.005	U			0.0063			0.005	U			0.005	U			0.005	U			0.005	U			0.005	U	
Cobalt	nonpar	78	5	0.003	--	0.005	U				0.015		E			0.005	U				0.005	U			0.005	U			0.005	U			0.005	U			0.005	U			0.005	U				
Copper	nonpar	75	40	0.115	1	0.007					0.005	U				0.005	U				0.006				0.005	U			0.006			0.005	U			0.005	U			0.005	U			0.01		
Iron	lognor	76	48	12.9457	0.3	0.026					22.3		E	I	N	0.902			I	N	0.024				9.68			0.01	U			0.168			I	N	0.035					0.035				
Lead	nonpar	79	33	0.0027	0.05	0.000101					0.0001	U				0.000668					0.000423				0.000125			0.0001	U			0.000162				0.000146										
Manganese	lognor	72	56	4.7921	0.05	0.005	U				6.04		E			0.024					0.028				3.01			D	N	0.020			0.008			0.005	U			0.005	U					
Nickel	nonpar	77	20	0.038	0.1	0.006					0.018					0.005	U				0.018				0.007			0.006			0.005	U			0.005	U			0.013				0.013			
Selenium	nonpar	78	6	0.002	0.01	0.0003	U				0.00034					0.0003	U				0.0003	U			0.0003	U			0.0003	U			0.0003	U			0.0003	U			0.0003	U				
Silver	nonpar	73	4	0.0002	0.05	0.0001	U				0.0001	U				0.0001	U				0.0001	U			0.0001	U			0.0001	U			0.0001	U			0.0001	U			0.0001	U				
Thallium	nonpar	78	6	0.003	0.002	0.00005	U				0.00005	U				0.00005	U				0.00005	U			0.00005	U			0.00005	U			0.00005	U			0.00005	U			0.00005	U				
Vanadium	nonpar	79	2	0.01	--	0.01	U				0.01	U				0.01	U				0.01	U			0.01	U			0.01	U			0.01	U			0.01	U			0.01	U				
Zinc	nonpar	78	33	0.03	5	0.005	U				0.005	U				0.005	U				0.005	U			0.005	U			0.005	U			0.005	U			0.005	U			0.005	U				
TOTAL METALS EPA Methods 200.7/200.8 (mg/L)																																														
Antimony					0.006	0.0003	U				0.0003	U				0.0003	U				0.0003	U			0.0003	U			0.0003	U			0.0003	U			0.0003	U			0.0003	U				
Arsenic					0.00005	0.000336					0.0197					0.000946					0.001				0.00504			0.000516			0.00293				0.000663											
Barium					1	0.005	U				0.0078					0.0286					0.0127				0.0057			0.005	U			0.0442			0.0079											
Beryllium					0.004	0.0005	U				0.0005	U				0.0005	U				0.0005	U			0.0005	U			0.0005	U			0.0005	U			0.0005	U			0.0005	U				
Cadmium					0.005	0.00005	U				0.00005	U				0.00005	U				0.00005	U			0.00005	U			0.00005	U			0.00005	U			0.00005	U			0.00005	U				
Chromium					0.05	0.005	U				0.0129					0.0081					0.0115				0.005	U			0.005	U			0.0202			0.0154										
Cobalt					--	0.005	U				0.013					0.005	U				0.005	U			0.005	U			0.005	U			0.005	U			0.005	U			0.005	U				
Copper					1	0.009					0.005	U				0.005	U				0.006				0.005	U			0.005	U			0.01			0.02										
Iron					0.3	0.204					27.7					3.95					1.80				11.2			0.046			6.92			0.556												
Lead					0.05	0.000208					0.000685					0.000908					0.00169				0.0001	U		0.000133			0.0013			0.000503												
Manganese					0.05	0.005	U				7.4					0.065																														

Groundwater Analytical Summary - Shallow Wells: Fourth Quarter 2019
Cathcart Landfill, Snohomish County, WA

	Statistical Method	Number of Samples	Number of Detects	Prediction Limit	Primary GW Stds 173-200	Downgradient Wells																				Upgradient Wells														
						G-01A				G-04A				G-08D1				G-09S				G-10S				G-11S				G-14S				G-24S						
						10/23/19	D	V	Tr	Ch	10/22/19	D	V	Tr	Ch	10/22/19	D	V	Tr	Ch	10/23/19	D	V	Tr	Ch	10/23/19	D	V	Tr	Ch	10/22/19	D	V	Tr	Ch	10/22/19	D	V	Tr	Ch
VOLATILE ORGANIC COMPOUNDS (VOCs) EPA Method 8260 (µg/L) (cont.)																																								
1,1-Dichloroethylene					--	1	U				1	U				1	U				1	U				1	U				1	U				1	U			
1,2,3-Trichloropropane					--	1	U				1	U				1	U				1	U				1	U				1	U				1	U			
1,2-Dibromo-3-chloropropane					0.2	0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U			
1,2-Dibromoethane					0.001	0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U			
1,2-Dichlorobenzene					--	1	U				1	U				1	U				1	U				1	U				1	U				1	U			
1,2-Dichloroethane					0.5	0.5	U				0.5	U				0.5	U				0.5	U				0.5	U				0.5	U				0.5	U			
1,2-Dichloropropane					0.6	0.6	U				0.6	U				0.6	U				0.6	U				0.6	U				0.6	U				0.6	U			
1,4-Dichlorobenzene					4	1	U				1	U				1	U				1	U				1	U				1	U				1	U			
2-Butanone					--	5	U				5	U				5	U				5	U				5	U				5	U				5	U			
2-Hexanone					--	5	U				5	U				5	U				5	U				5	U				5	U				5	U			
4-Methyl-2-Pentanone (MIBK)					--	5	U				5	U				5	U				5	U				5	U				5	U				5	U			
Acetone					--	5	U				5.1					5	U				5	U				5	U				5	U				5	U			
Acrylonitrile					0.07	0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U			
Benzene					1	1	U				1	U				1	U				1	U				1	U				1	U				1	U			
Bromodichloromethane					0.3	0.3	U				0.3	U				0.3	U				0.3	U				0.3	U				0.3	U				0.3	U			
Bromoform					5	1	U				1	U				1	U				1	U				1	U				1	U				1	U			
Bromomethane					--	1	U				1	U				1	U				1	U				1	U				1	U				1	U			
Carbon Disulfide					--	1	U				1	U				1	U				1	U				1	U				1	U				1	U			
Carbon Tetrachloride					0.3	0.3	U				0.3	U				0.3	U				0.3	U				0.3	U				0.3	U				0.3	U			
Chlorobenzene					--	0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U			
Chlorodibromomethane					0.5	0.5	U				0.5	U				0.5	U				0.5	U				0.5	U				0.5	U				0.5	U			
Chloroethane					--	1	U				1	U				1	U				1	U				1	U				1	U				1	U			
Chloroform					7	1	U				1	U				1	U				1	U				1	U				1	U				1	U			
Chloromethane					--	1	U				1	U				1	U				1	U				1	U				1	U				1	U			
cis-1,2-Dichloroethene					--	0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U			
cis-1,3-Dichloropropene					0.2	0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U			
Dibromomethane					--	0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U			
Ethyl Benzene					--	1	U				1	U				1	U				1	U				1	U				1	U				1	U			
m,p-Xylene					--	1	U				1	U				1	U				1	U				1	U				1	U				1	U			
Methyl Iodide					--	1	U				1	U				1	U				1	U				1	U				1	U				1	U			
Methylene Chloride					5	2.0	U				2.0	U				2.0	U				2.0	U				2.0	U				2.0	U				2.0	U			
o-Xylene					--	1	U				1	U				1	U				1	U				1	U				1	U				1	U			
Styrene					--	1	U				1	U				1	U				1	U				1	U				1	U				1	U			
Tetrachloroethylene					0.8	0.8	U				0.8	U				0.8	U				0.8	U				0.8	U				0.8	U				0.8	U			
Toluene					--	1.6					1.1					1	U				1.3	1.1				1.5				1	U				1	U				
trans-1,2-Dichloroethene					--	1	U				1	U				1	U				1	U				1	U				1	U				1	U			
trans-1,3-Dichloropropene					0.2	0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U			
trans-1,4-Dichloro-2-butene					--	5	U				5	U				5	U				5	U				5	U				5	U				5	U			
Trichloroethene (1,1,2-Trichloroethylene)					3	1	U				1	U				1	U				1	U				1	U				1	U				1	U			
Trichlorofluoromethane					--	1	U				1	U				1	U				1	U				1	U				1	U				1	U			
Vinyl Acetate					--	5	U				5	U				5	U				5	U				5	U				5	U				5	U			
Vinyl Chloride					0.02	0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U			

D: U = Indicates compound was not detected at the given reporting limit; X indicates that the compound was detected in the trip blank and contamination is suspected.
V: E= Exceedance, waiting verification based on subsequent lab data; V= Exceedance verified based on previous lab data; P=Passed, previous exceedance not verified based on current lab data.
Tr: I=Increasing Trend, D=Decreasing Trend;
Ch: Y indicates a change in trend from previous quarter; N means no change in trend.
Values in purple exceed the prediction limit; indicates that a value exceeded the Groundwater Standards
The groundwater standards listed are based on the Washington Administrative Code (WAC) 173-200 groundwater limits as modified by the TMS 91-11 standards.

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result	Pred. Limit
Alkalinity (as cacO ₃)	mg/L	G-01A	10/23/2019		32.0000	200.0000
Ammonia nitrogen	mg-N/L	G-01A	10/23/2019	ND	0.0200	15.4733
Bicarbonate	mg/L	G-01A	10/23/2019		32.0000	200.0000
Chemical oxygen demand	mg/L	G-01A	10/23/2019		26.0000	28.0000
Chloride	mg/L	G-01A	10/23/2019		0.5700	18.3000
Conductivity	umhos/cm	G-01A	10/23/2019		130.0000	540.0000
Dissolved antimony	mg/L	G-01A	10/23/2019	ND	0.0003	0.0019
Dissolved arsenic	mg/L	G-01A	10/23/2019		0.0002	0.0040
Dissolved barium	mg/L	G-01A	10/23/2019		0.0018	3.5787
Dissolved beryllium	mg/L	G-01A	10/23/2019	ND	0.0005	0.0005
Dissolved cadmium	mg/L	G-01A	10/23/2019	ND	0.0001	0.0010
Dissolved calcium	mg/L	G-01A	10/23/2019		12.3000	23.6553
Dissolved chromium	mg/L	G-01A	10/23/2019	ND	0.0050	0.0150
Dissolved cobalt	mg/L	G-01A	10/23/2019	ND	0.0050	0.0030
Dissolved copper	mg/L	G-01A	10/23/2019		0.0070	44.5044
Dissolved iron	mg/L	G-01A	10/23/2019		0.0260	12.1810
Dissolved lead	mg/L	G-01A	10/23/2019		0.0001	0.0027
Dissolved magnesium	mg/L	G-01A	10/23/2019		3.3500	53.7501
Dissolved manganese	mg/L	G-01A	10/23/2019	ND	0.0050	5.2135
Dissolved nickel	mg/L	G-01A	10/23/2019		0.0060	0.0380
Dissolved potassium	mg/L	G-01A	10/23/2019		1.0300	2.7135
Dissolved selenium	mg/L	G-01A	10/23/2019	ND	0.0003	0.0020
Dissolved silver	mg/L	G-01A	10/23/2019	ND	0.0001	0.0002
Dissolved sodium	mg/L	G-01A	10/23/2019		5.9900	125.8003
Dissolved thallium	mg/L	G-01A	10/23/2019	ND	0.0001	0.0030
Dissolved thallium	mg/L	G-01A	10/23/2019	ND	0.0100	0.0100
Dissolved zinc	mg/L	G-01A	10/23/2019	ND	0.0050	0.0300
Nitrate nitrogen	mg-N/L	G-01A	10/23/2019		0.0330	2.4600
Nitrite nitrogen	mg-N/L	G-01A	10/23/2019	ND	0.0020	28.2680
pH	std units	G-01A	10/23/2019		6.2300	5.73 - 10.18
Sulfate	mg/L	G-01A	10/23/2019		26.0000	287.0336
Total dissolved solids	mg/L	G-01A	10/23/2019		81.0000	403.6946
Total organic carbon	mg/L	G-01A	10/23/2019		7.2000	22.0000
Alkalinity (as cacO ₃)	mg/L	G-04A	10/22/2019		270.0000	200.0000
Ammonia nitrogen	mg-N/L	G-04A	10/22/2019		0.2270	15.4733
Bicarbonate	mg/L	G-04A	10/22/2019		270.0000	200.0000
Chemical oxygen demand	mg/L	G-04A	10/22/2019		41.0000	28.0000
Chloride	mg/L	G-04A	10/22/2019		7.1300	18.3000
Conductivity	umhos/cm	G-04A	10/22/2019		530.0000	540.0000
Dissolved antimony	mg/L	G-04A	10/22/2019	ND	0.0003	0.0019
Dissolved arsenic	mg/L	G-04A	10/22/2019		0.0215	0.0040
Dissolved barium	mg/L	G-04A	10/22/2019		0.0056	3.5787
Dissolved beryllium	mg/L	G-04A	10/22/2019	ND	0.0005	0.0005
Dissolved cadmium	mg/L	G-04A	10/22/2019	ND	0.0001	0.0010
Dissolved calcium	mg/L	G-04A	10/22/2019		43.1000	23.6553
Dissolved chromium	mg/L	G-04A	10/22/2019		0.0114	0.0150
Dissolved cobalt	mg/L	G-04A	10/22/2019		0.0150	0.0030
Dissolved copper	mg/L	G-04A	10/22/2019	ND	0.0050	44.5044
Dissolved iron	mg/L	G-04A	10/22/2019		22.3000	12.1810
Dissolved lead	mg/L	G-04A	10/22/2019	ND	0.0001	0.0027
Dissolved magnesium	mg/L	G-04A	10/22/2019		24.7000	53.7501
Dissolved manganese	mg/L	G-04A	10/22/2019		6.0400	5.2135
Dissolved nickel	mg/L	G-04A	10/22/2019		0.0180	0.0380
Dissolved potassium	mg/L	G-04A	10/22/2019		2.1800	2.7135
Dissolved selenium	mg/L	G-04A	10/22/2019		0.0003	0.0020
Dissolved silver	mg/L	G-04A	10/22/2019	ND	0.0001	0.0002
Dissolved sodium	mg/L	G-04A	10/22/2019		14.3000	125.8003
Dissolved thallium	mg/L	G-04A	10/22/2019	ND	0.0001	0.0030
Dissolved vanadium	mg/L	G-04A	10/22/2019	ND	0.0100	0.0100
Dissolved zinc	mg/L	G-04A	10/22/2019	ND	0.0050	0.0300
Nitrate nitrogen	mg-N/L	G-04A	10/22/2019	ND	0.0100	2.4600
Nitrite nitrogen	mg-N/L	G-04A	10/22/2019	ND	0.0020	28.2680
pH	std units	G-04A	10/22/2019		6.0300	5.73 - 10.18
Sulfate	mg/L	G-04A	10/22/2019		24.9000	287.0336
Total dissolved solids	mg/L	G-04A	10/22/2019		350.0000	403.6946
Total organic carbon	mg/L	G-04A	10/22/2019		20.0000	22.0000
Alkalinity (as cacO ₃)	mg/L	G-08D1	10/22/2019		180.0000	200.0000

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result		Pred. Limit
Ammonia nitrogen	mg-N/L	G-08D1	10/22/2019		0.1170		15.4733
Bicarbonate	mg/L	G-08D1	10/22/2019		110.0000		200.0000
Chemical oxygen demand	mg/L	G-08D1	10/22/2019	ND	10.0000		28.0000
Chloride	mg/L	G-08D1	10/22/2019		2.8600		18.3000
Conductivity	umhos/cm	G-08D1	10/22/2019		420.0000		540.0000
Dissolved antimony	mg/L	G-08D1	10/22/2019	ND	0.0003		0.0019
Dissolved arsenic	mg/L	G-08D1	10/22/2019		0.0021		0.0040
Dissolved barium	mg/L	G-08D1	10/22/2019		0.0039		3.5787
Dissolved beryllium	mg/L	G-08D1	10/22/2019	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-08D1	10/22/2019	ND	0.0001		0.0010
Dissolved calcium	mg/L	G-08D1	10/22/2019		1.1000		23.6553
Dissolved chromium	mg/L	G-08D1	10/22/2019	ND	0.0050		0.0150
Dissolved cobalt	mg/L	G-08D1	10/22/2019	ND	0.0050		0.0030
Dissolved copper	mg/L	G-08D1	10/22/2019	ND	0.0050		44.5044
Dissolved iron	mg/L	G-08D1	10/22/2019		0.9020		12.1810
Dissolved lead	mg/L	G-08D1	10/22/2019		0.0007		0.0027
Dissolved magnesium	mg/L	G-08D1	10/22/2019		0.2600		53.7501
Dissolved manganese	mg/L	G-08D1	10/22/2019		0.0240		5.2135
Dissolved nickel	mg/L	G-08D1	10/22/2019	ND	0.0050		0.0380
Dissolved potassium	mg/L	G-08D1	10/22/2019		0.3700		2.7135
Dissolved selenium	mg/L	G-08D1	10/22/2019	ND	0.0003		0.0020
Dissolved silver	mg/L	G-08D1	10/22/2019	ND	0.0001		0.0002
Dissolved sodium	mg/L	G-08D1	10/22/2019		107.0000		125.8003
Dissolved thallium	mg/L	G-08D1	10/22/2019	ND	0.0001		0.0030
Dissolved vanadium	mg/L	G-08D1	10/22/2019	ND	0.0100		0.0100
Dissolved zinc	mg/L	G-08D1	10/22/2019	ND	0.0050		0.0300
Nitrate nitrogen	mg-N/L	G-08D1	10/22/2019		0.0300		2.4600
Nitrite nitrogen	mg-N/L	G-08D1	10/22/2019		0.0040		28.2680
pH	std units	G-08D1	10/22/2019		9.5900		5.73 - 10.18
Sulfate	mg/L	G-08D1	10/22/2019		50.5000		287.0336
Total dissolved solids	mg/L	G-08D1	10/22/2019		280.0000		403.6946
Total organic carbon	mg/L	G-08D1	10/22/2019		1.5000		22.0000
Alkalinity (as cacO3)	mg/L	G-09S	10/23/2019		360.0000	***	200.0000
Ammonia nitrogen	mg-N/L	G-09S	10/23/2019	ND	0.0200		15.4733
Bicarbonate	mg/L	G-09S	10/23/2019		360.0000	***	200.0000
Chemical oxygen demand	mg/L	G-09S	10/23/2019		29.0000	*	28.0000
Chloride	mg/L	G-09S	10/23/2019		4.7600		18.3000
Conductivity	umhos/cm	G-09S	10/23/2019		950.0000	***	540.0000
Dissolved antimony	mg/L	G-09S	10/23/2019	ND	0.0003		0.0019
Dissolved arsenic	mg/L	G-09S	10/23/2019		0.0007		0.0040
Dissolved barium	mg/L	G-09S	10/23/2019		0.0034		3.5787
Dissolved beryllium	mg/L	G-09S	10/23/2019	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-09S	10/23/2019	ND	0.0001		0.0010
Dissolved calcium	mg/L	G-09S	10/23/2019		76.3000	***	23.6553
Dissolved chromium	mg/L	G-09S	10/23/2019	ND	0.0050		0.0150
Dissolved cobalt	mg/L	G-09S	10/23/2019	ND	0.0050		0.0030
Dissolved copper	mg/L	G-09S	10/23/2019		0.0060		44.5044
Dissolved iron	mg/L	G-09S	10/23/2019		0.0240		12.1810
Dissolved lead	mg/L	G-09S	10/23/2019		0.0004		0.0027
Dissolved magnesium	mg/L	G-09S	10/23/2019		28.0000		53.7501
Dissolved manganese	mg/L	G-09S	10/23/2019		0.0280		5.2135
Dissolved nickel	mg/L	G-09S	10/23/2019		0.0180		0.0380
Dissolved potassium	mg/L	G-09S	10/23/2019		4.4100	***	2.7135
Dissolved selenium	mg/L	G-09S	10/23/2019	ND	0.0003		0.0020
Dissolved silver	mg/L	G-09S	10/23/2019	ND	0.0001		0.0002
Dissolved sodium	mg/L	G-09S	10/23/2019		86.6000	**	125.8003
Dissolved thallium	mg/L	G-09S	10/23/2019	ND	0.0001		0.0030
Dissolved vanadium	mg/L	G-09S	10/23/2019	ND	0.0100		0.0100
Dissolved zinc	mg/L	G-09S	10/23/2019	ND	0.0050		0.0300
Nitrate nitrogen	mg-N/L	G-09S	10/23/2019	ND	0.0100		2.4600
Nitrite nitrogen	mg-N/L	G-09S	10/23/2019		0.0030		28.2680
pH	std units	G-09S	10/23/2019		6.1600		5.73 - 10.18
Sulfate	mg/L	G-09S	10/23/2019		178.0000		287.0336
Total dissolved solids	mg/L	G-09S	10/23/2019		560.0000	***	403.6946
Total organic carbon	mg/L	G-09S	10/23/2019		4.3000		22.0000
Alkalinity (as cacO3)	mg/L	G-10S	10/23/2019		440.0000	***	200.0000
Ammonia nitrogen	mg-N/L	G-10S	10/23/2019		0.2640		15.4733

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result		Pred. Limit
Bicarbonate	mg/L	G-10S	10/23/2019		440.0000	***	200.0000
Chemical oxygen demand	mg/L	G-10S	10/23/2019		21.0000		28.0000
Chloride	mg/L	G-10S	10/23/2019		7.0200		18.3000
Conductivity	umhos/cm	G-10S	10/23/2019		1400.0000	***	540.0000
Dissolved antimony	mg/L	G-10S	10/23/2019	ND	0.0003		0.0019
Dissolved arsenic	mg/L	G-10S	10/23/2019		0.0060	***	0.0040
Dissolved barium	mg/L	G-10S	10/23/2019		0.0066		3.5787
Dissolved beryllium	mg/L	G-10S	10/23/2019	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-10S	10/23/2019	ND	0.0001		0.0010
Dissolved calcium	mg/L	G-10S	10/23/2019		100.0000	***	23.6553
Dissolved chromium	mg/L	G-10S	10/23/2019		0.0063		0.0150
Dissolved cobalt	mg/L	G-10S	10/23/2019	ND	0.0050		0.0030
Dissolved copper	mg/L	G-10S	10/23/2019	ND	0.0050		44.5044
Dissolved iron	mg/L	G-10S	10/23/2019		9.6800		12.1810
Dissolved lead	mg/L	G-10S	10/23/2019		0.0001		0.0027
Dissolved magnesium	mg/L	G-10S	10/23/2019		23.0000		53.7501
Dissolved manganese	mg/L	G-10S	10/23/2019		3.0100		5.2135
Dissolved nickel	mg/L	G-10S	10/23/2019		0.0070		0.0380
Dissolved potassium	mg/L	G-10S	10/23/2019		3.3800	***	2.7135
Dissolved selenium	mg/L	G-10S	10/23/2019	ND	0.0003		0.0020
Dissolved silver	mg/L	G-10S	10/23/2019	ND	0.0001		0.0002
Dissolved sodium	mg/L	G-10S	10/23/2019		186.0000	***	125.8003
Dissolved thallium	mg/L	G-10S	10/23/2019	ND	0.0001		0.0030
Dissolved vanadium	mg/L	G-10S	10/23/2019	ND	0.0100		0.0100
Dissolved zinc	mg/L	G-10S	10/23/2019	ND	0.0050		0.0300
Nitrate nitrogen	mg-N/L	G-10S	10/23/2019	ND	0.0100		2.4600
Nitrite nitrogen	mg-N/L	G-10S	10/23/2019	ND	0.0020		28.2680
pH	std units	G-10S	10/23/2019		6.5900		5.73 - 10.18
Sulfate	mg/L	G-10S	10/23/2019		323.0000	*	287.0336
Total dissolved solids	mg/L	G-10S	10/23/2019		930.0000	***	403.6946
Total organic carbon	mg/L	G-10S	10/23/2019		4.2000		22.0000
Alkalinity (as cacO3)	mg/L	G-11S	10/22/2019		90.0000		200.0000
Ammonia nitrogen	mg-N/L	G-11S	10/22/2019	ND	0.0200		15.4733
Bicarbonate	mg/L	G-11S	10/22/2019		90.0000		200.0000
Chemical oxygen demand	mg/L	G-11S	10/22/2019	ND	10.0000		28.0000
Chloride	mg/L	G-11S	10/22/2019		7.1600		18.3000
Conductivity	umhos/cm	G-11S	10/22/2019		260.0000		540.0000
Dissolved antimony	mg/L	G-11S	10/22/2019	ND	0.0003		0.0019
Dissolved arsenic	mg/L	G-11S	10/22/2019		0.0006		0.0040
Dissolved barium	mg/L	G-11S	10/22/2019		0.0007		3.5787
Dissolved beryllium	mg/L	G-11S	10/22/2019	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-11S	10/22/2019	ND	0.0001		0.0010
Dissolved calcium	mg/L	G-11S	10/22/2019		8.9400		23.6553
Dissolved chromium	mg/L	G-11S	10/22/2019	ND	0.0050		0.0150
Dissolved cobalt	mg/L	G-11S	10/22/2019	ND	0.0050		0.0030
Dissolved copper	mg/L	G-11S	10/22/2019		0.0060		44.5044
Dissolved iron	mg/L	G-11S	10/22/2019	ND	0.0100		12.1810
Dissolved lead	mg/L	G-11S	10/22/2019	ND	0.0001		0.0027
Dissolved magnesium	mg/L	G-11S	10/22/2019		1.8500		53.7501
Dissolved manganese	mg/L	G-11S	10/22/2019		0.0200		5.2135
Dissolved nickel	mg/L	G-11S	10/22/2019		0.0060		0.0380
Dissolved potassium	mg/L	G-11S	10/22/2019		0.8800		2.7135
Dissolved selenium	mg/L	G-11S	10/22/2019	ND	0.0003		0.0020
Dissolved silver	mg/L	G-11S	10/22/2019	ND	0.0001		0.0002
Dissolved sodium	mg/L	G-11S	10/22/2019		50.1000		125.8003
Dissolved thallium	mg/L	G-11S	10/22/2019	ND	0.0001		0.0030
Dissolved vanadium	mg/L	G-11S	10/22/2019	ND	0.0100		0.0100
Dissolved zinc	mg/L	G-11S	10/22/2019	ND	0.0050		0.0300
Nitrate nitrogen	mg-N/L	G-11S	10/22/2019	ND	0.0100		2.4600
Nitrite nitrogen	mg-N/L	G-11S	10/22/2019	ND	0.0020		28.2680
pH	std units	G-11S	10/22/2019		6.8600		5.73 - 10.18
Sulfate	mg/L	G-11S	10/22/2019		35.3000		287.0336
Total dissolved solids	mg/L	G-11S	10/22/2019		140.0000		403.6946

Table 2**Most Current Downgradient Monitoring Data**

Constituent	Units	Well	Date	Result	Pred. Limit
Total organic carbon	mg/L	G-11S	10/22/2019	2.7000	22.0000

- * - Current value failed - awaiting verification.
 - ** - Current value passed - previous exceedance not verified.
 - *** - Current value failed - exceedance verified.
 - **** - Current value passed - awaiting one more verification.
 - ***** - Insufficient background data to compute prediction limit.
- ND = Not Detected, Result = detection limit.

Table 5

Summary Statistics and Prediction Limits

Constituent	Units	Detect	N	Mean	SD	alpha	Factor	Pred Limit	Type		Conf
Alkalinity (as cacO ₃)	mg/L	81	81					200.0000	nonpar		0.99
Ammonia nitrogen	mg-N/L	43	77	-2.1471	2.0429	0.0100	2.3918	15.4733	lognor		
Bicarbonate	mg/L	81	81					200.0000	nonpar		0.99
Chemical oxygen demand	mg/L	11	81					28.0000	nonpar		0.99
Chloride	mg/L	80	81					18.3000	nonpar		0.99
Conductivity	umhos/cm	80	80					540.0000	nonpar		0.99
Dissolved antimony	mg/L	34	81					0.0019	nonpar		0.99
Dissolved arsenic	mg/L	72	76					0.0040	nonpar		0.99
Dissolved barium	mg/L	59	74	-4.6056	2.4558	0.0100	2.3945	3.5787	lognor		
Dissolved beryllium	mg/L	0	81					0.0005	nonpar	***	0.99
Dissolved cadmium	mg/L	35	76					0.0010	nonpar		0.99
Dissolved calcium	mg/L	79	79	7.1548	6.9037	0.0100	2.3901	23.6553	normal		
Dissolved chromium	mg/L	29	79					0.0150	nonpar		0.99
Dissolved cobalt	mg/L	5	80					0.0030	nonpar		0.99
Dissolved copper	mg/L	41	77	-2.7651	2.7430	0.0100	2.3918	44.5044	lognor		
Dissolved iron	mg/L	50	78	-1.8879	1.8352	0.0100	2.3909	12.1810	lognor		
Dissolved lead	mg/L	35	81					0.0027	nonpar		0.99
Dissolved magnesium	mg/L	66	77	-0.0763	1.6977	0.0100	2.3918	53.7501	lognor		
Dissolved manganese	mg/L	57	74	-4.1019	2.4026	0.0100	2.3945	5.2135	lognor		
Dissolved nickel	mg/L	21	79					0.0380	nonpar		0.99
Dissolved potassium	mg/L	76	79	-0.7079	0.7138	0.0100	2.3901	2.7135	lognor		
Dissolved selenium	mg/L	6	80					0.0020	nonpar		0.99
Dissolved silver	mg/L	4	75					0.0002	nonpar		0.99
Dissolved sodium	mg/L	79	79	89.7797	15.0708	0.0100	2.3901	125.8003	normal		
Dissolved thallium	mg/L	6	80					0.0030	nonpar		0.99
Dissolved vanadium	mg/L	2	81					0.0100	nonpar		0.99
Dissolved zinc	mg/L	33	80					0.0300	nonpar		0.99
Nitrate nitrogen	mg-N/L	72	78	-2.0269	1.2243	0.0100	2.3909	2.4600	lognor		
Nitrite nitrogen	mg-N/L	44	73	-3.3682	2.8011	0.0100	2.3955	28.2680	lognor		
pH	std units	81	81	7.9567	0.8376	0.0100	2.6549	5.73 - 10.18	normal		
Sulfate	mg/L	80	80	3.8591	0.7536	0.0100	2.3893	287.0336	lognor		
Total dissolved solids	mg/L	81	81	282.0988	50.9096	0.0100	2.3885	403.6946	normal		
Total organic carbon	mg/L	72	81					22.0000	nonpar		0.99

Conf = confidence level for passing initial test or one of two verification resamples at all downgradient wells for a single constituent (nonparametric test only).

* - Insufficient Data.

** - Calculated limit raised to Manual Reporting Limit.

*** - Nonparametric limit based on ND value.

For transformed data, mean and SD in transformed units and prediction limit in original units.

All sample sizes and statistics are based on outlier free data.

For nonparametric limits, median reporting limits are substituted for extreme reporting limit values.

Deep Wells

Groundwater Analytical Summary - Deep Wells: First Quarter 2019
Cathcart Landfill, Snohomish County, WA

	Statistical Method	Number of Samples	Number of Detects	Prediction Limit	Primary GW Stds 173-200	G-09D					G-10D					
						1/15/19	D	V	Tr	Ch	1/15/19	D	V	Tr	Ch	
						CONVENTIONAL CHEMISTRY PARAMETERS (mg/L)										
Alkalinity (as CaCO3)	nonpar	66	66	280	--	170					500		V			
Ammonia Nitrogen	nonpar	59	59	0.57	--	0.126					0.301					
Bicarbonate	nonpar	66	66	280	--	150					500		V			
Calcium, Dissolved	nonpar	63	63	6.32	--	1.62			D	N	24.2		V	D	N	
Chemical Oxygen Demand	nonpar	66	16	160	--	10	U				10	U				
Chloride	lognor	66	65	9.4402	250	8.1		P		Y	17.4		V	D	Y	
Conductivity (umhos/cm)	nonpar	66	66	510	700	690		V		Y	1600		V			
Magnesium, Dissolved	nonpar	62	40	0.31	--	0.20	U				2.07		V	D	N	
Nitrate Nitrogen (mg-N/L)	nonpar	65	14	0.21	10	0.14		P			0.01	U				
Nitrite Nitrogen (mg-N/L)	nonpar	59	29	0.6	1	0.005					0.001					
pH (std units)	nonpar	65	65	6.02-10.02	6.5-8.5	9.20					6.87					
Potassium, Dissolved	nonpar	66	62	1.6	--	0.52					1.73		V			
Sodium, Dissolved	nonpar	63	63	119	20	138			V		305		V	D	N	
Sulfate	nonpar	65	65	66.05	250	153		V			442		V		Y	
Total Dissolved Solids	nonpar	66	66	480	500	480		P			1100		V			
Total Organic Carbon	nonpar	66	62	63	--	3.1					3.9				D	Y
DISSOLVED METALS EPA Methods 200.7/200.8 (mg/L)																
Antimony	nonpar	66	11	0.01	0.006	0.0003	U				0.0003	U				
Arsenic	lognor	62	45	29.9523	0.00005	0.00521					0.00195					
Barium	nonpar	63	13	0.0037	1	0.0005	U				0.0005	U				
Beryllium	nonpar	66	0	0.0005	0.004	0.0005	U				0.0005	U				
Cadmium	nonpar	58	9	0.0001	0.005	0.00005	U				0.00005	U				
Chromium	nonpar	66	8	0.0136	0.05	0.0053					0.005	U				
Cobalt	nonpar	66	4	0.004	--	0.005	U				0.005	U				
Copper	nonpar	63	10	0.008	1	0.015		E			0.005	U				
Iron	lognor	60	30	21.2604	0.3	0.194					0.687					
Lead	nonpar	66	20	0.0023	0.05	0.000714			D	Y	0.0001	U				
Manganese	lognor	57	43	6.1166	0.05	0.0308					0.4555			D	N	
Nickel	nonpar	65	2	0.006	0.1	0.007		E			0.006					
Selenium	nonpar	65	16	0.0025	0.01	0.00089					0.00119					
Silver	nonpar	62	6	0.0007	0.05	0.0001	U				0.0001	U				
Thallium	nonpar	65	7	0.003	0.002	0.00005	U				0.00005	U				
Vanadium	nonpar	66	0	0.005	--	0.01	U				0.01	U				
Zinc	nonpar	65	17	0.012	5	0.009					0.005	U				
TOTAL METALS EPA Methods 200.7/200.8 (mg/L)																
Antimony					0.006	0.0003	U				0.0003	U				
Arsenic					0.00005	0.00314					0.00103					
Barium					1	0.006					0.002					
Beryllium					0.004	0.0005	U				0.0005	U				
Cadmium					0.005	0.00005	U				0.00005	U				
Chromium					0.05	0.005	U				0.005	U				
Cobalt					--	0.005	U				0.005	U				
Copper					1	0.071					0.005	U				
Iron					0.3	1.77					0.781					
Lead					0.05	0.00173					0.000136					
Manganese					0.05	0.084					0.454					
Nickel					0.1	0.012					0.006					
Selenium					0.01	0.00218					0.00323					
Silver					0.05	0.0001	U				0.0001	U				
Thallium					0.002	0.00005	U				0.00005	U				
Vanadium					--	0.01	U				0.01	U				
Zinc					5	0.0098					0.005	U				
VOLATILE ORGANIC COMPOUNDS (VOCs) EPA Method 8260 (µg/L)																
1,1,1-Trichloroethane					200	1	U				1	U				
1,1,2,2-Tetrachloroethane					--	1	U				1	U				
1,1,2-Trichloroethane					--	1	U				1	U				
1,1-Dichloroethane					1	1	U				1	U				

Groundwater Analytical Summary - Deep Wells: First Quarter 2019
Cathcart Landfill, Snohomish County, WA

	Statistical Method	Number of Samples	Number of Detects	Prediction Limit	Primary GW Stds 173-200	G-09D					G-10D				
						1/15/19	D	V	Tr	Ch	1/15/19	D	V	Tr	Ch
						VOLATILE ORGANIC COMPOUNDS (VOCs) EPA Method 8260 (µg/L) (cont.)									
1,1-Dichloroethylene					--	1	U				1	U			
1,2,3-Trichloropropane					--	1	U				1	U			
1,2-Dibromo-3-chloropropane					0.2	5	U				5	U			
1,2-Dibromoethane					0.001	0.01	U				0.01	U			
1,2-Dichlorobenzene					--	1	U				1	U			
1,2-Dichloroethane					0.5	0.5	U				0.5	U			
1,2-Dichloropropane					0.6	0.6	U				0.6	U			
1,4-Dichlorobenzene					4	1	U				1	U			
2-Butanone					--	5	U				5	U			
2-Hexanone					--	5	U				5	U			
4-Methyl-2-Pentanone (MIBK)					--	5	U				5	U			
Acetone					--	5	U				5	U			
Acrylonitrile					0.07	0.01	U				0.01	U			
Benzene					1	1	U				1	U			
Bromodichloromethane					0.3	0.3	U				0.3	U			
Bromoform					5	1	U				1	U			
Bromomethane					--	1	U				1	U			
Carbon Disulfide					--	1	U				1	U			
Carbon Tetrachloride					0.3	0.3	U				0.3	U			
Chlorobenzene					--	0.2	U				0.2	U			
Chlorodibromomethane					0.5	0.5	U				0.5	U			
Chloroethane					--	1	U				1	U			
Chloroform					7	1	U				1	U			
Chloromethane					--	1	U				1	U			
cis-1,2-Dichloroethene					--	0.2	U				0.2	U			
cis-1,3-Dichloropropene					0.2	0.2	U				0.2	U			
Dibromomethane					--	0.01	U				0.01	U			
Ethyl Benzene					--	1	U				1	U			
m,p-Xylene					--	1	U				1	U			
Methyl Iodide					--	1	U				1	U			
Methylene Chloride					5	2	U				2	U			
o-Xylene					--	1	U				1	U			
Styrene					--	1	U				1	U			
Tetrachloroethylene					0.8	0.8	U				0.8	U			
Toluene					--	1.0					1	U			
trans-1,2-Dichloroethene					--	1	U				1	U			
trans-1,3-Dichloropropene					0.2	0.2	U				0.2	U			
trans-1,4-Dichloro-2-butene					--	5	U				5	U			
Trichlorethene (1,1,2-Trichloroethylene)					3	1	U				1	U			
Trichlorofluoromethane					--	1	U				1	U			
Vinyl Acetate					--	5	U				5	U			
Vinyl Chloride					0.02	0.2					0.01	U			

D: U = Indicates compound was not detected at the given reporting limit; X indicates that the compound was detected in the trip blank and contamination is suspected.
V: E= Exceedance, waiting verification based on subsequent lab data; V= Exceedance verified based on previous lab data; P=Passed, previous exceedance not verified based on current lab data.
Tr: I=increasing Trend, D=Decreasing Trend;
Ch: Y indicates a change in trend from previous quarter; N means no change in trend.
Values in purple exceed the prediction limit; indicates that a value exceeded the Groundwater Standards
The groundwater standards listed are based on the Washington Administrative Code (WAC) 173-200 groundwater limits as modified by the TMS 91-11 standards.
X = Methylene chloride was measured in the trip blank, but not in the lab blank - contaminations during transport is suspected.

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result	Pred. Limit
Alkalinity (as cacO ₃)	mg/L	G-01D	10/16/2018		270.0000	280.0000
Ammonia nitrogen	mg-N/L	G-01D	10/16/2018		0.1540	0.5700
Bicarbonate	mg/L	G-01D	10/16/2018		260.0000	280.0000
Chemical oxygen demand	mg/L	G-01D	10/16/2018	ND	10.0000	160.0000
Chloride	mg/L	G-01D	10/16/2018		7.7000	9.4402
Conductivity	umhos/cm	G-01D	10/16/2018		650.0000	510.0000
Dissolved antimony	mg/L	G-01D	10/16/2018	ND	0.0003	0.0100
Dissolved arsenic	mg/L	G-01D	10/16/2018		0.0003	29.9523
Dissolved barium	mg/L	G-01D	10/16/2018	ND	0.0005	0.0037
Dissolved beryllium	mg/L	G-01D	10/16/2018	ND	0.0005	0.0005
Dissolved cadmium	mg/L	G-01D	10/16/2018	ND	0.0001	0.0001
Dissolved calcium	mg/L	G-01D	10/16/2018		1.2700	6.3200
Dissolved chromium	mg/L	G-01D	10/16/2018	ND	0.0050	0.0136
Dissolved cobalt	mg/L	G-01D	10/16/2018	ND	0.0050	0.0040
Dissolved copper	mg/L	G-01D	10/16/2018	ND	0.0050	0.0080
Dissolved iron	mg/L	G-01D	10/16/2018	ND	0.0100	21.2604
Dissolved lead	mg/L	G-01D	10/16/2018		0.0001	0.0023
Dissolved magnesium	mg/L	G-01D	10/16/2018	ND	0.2000	0.3100
Dissolved manganese	mg/L	G-01D	10/16/2018	ND	0.0050	6.1166
Dissolved nickel	mg/L	G-01D	10/16/2018	ND	0.0050	0.0060
Dissolved potassium	mg/L	G-01D	10/16/2018		0.5600	1.6000
Dissolved selenium	mg/L	G-01D	10/16/2018		0.0008	0.0025
Dissolved silver	mg/L	G-01D	10/16/2018	ND	0.0001	0.0007
Dissolved sodium	mg/L	G-01D	10/16/2018		156.0000	119.0000
Dissolved thallium	mg/L	G-01D	10/16/2018	ND	0.0001	0.0030
Dissolved vanadium	mg/L	G-01D	10/16/2018	ND	0.0100	0.0050
Dissolved zinc	mg/L	G-01D	10/16/2018	ND	0.0050	0.0120
Nitrate nitrogen	mg-N/L	G-01D	10/16/2018	ND	0.0100	0.2100
Nitrite nitrogen	mg-N/L	G-01D	10/16/2018		0.0450	0.6000
pH	std units	G-01D	10/16/2018		9.0300	6.02 - 10.02
Sulfate	mg/L	G-01D	10/16/2018		53.0000	66.0500
Total dissolved solids	mg/L	G-01D	10/16/2018		450.0000	480.0000
Total organic carbon	mg/L	G-01D	10/16/2018		2.5000	63.0000
Alkalinity (as cacO ₃)	mg/L	G-02D	10/16/2018		110.0000	280.0000
Ammonia nitrogen	mg-N/L	G-02D	10/16/2018		0.0130	0.5700
Bicarbonate	mg/L	G-02D	10/16/2018		110.0000	280.0000
Chemical oxygen demand	mg/L	G-02D	10/16/2018	ND	10.0000	160.0000
Chloride	mg/L	G-02D	10/16/2018		6.1000	9.4402
Conductivity	umhos/cm	G-02D	10/16/2018		420.0000	510.0000
Dissolved antimony	mg/L	G-02D	10/16/2018	ND	0.0003	0.0100
Dissolved arsenic	mg/L	G-02D	10/16/2018		0.0037	29.9523
Dissolved barium	mg/L	G-02D	10/16/2018	ND	0.0005	0.0037
Dissolved beryllium	mg/L	G-02D	10/16/2018	ND	0.0005	0.0005
Dissolved cadmium	mg/L	G-02D	10/16/2018	ND	0.0001	0.0001
Dissolved calcium	mg/L	G-02D	10/16/2018		0.5800	6.3200
Dissolved chromium	mg/L	G-02D	10/16/2018	ND	0.0050	0.0136
Dissolved cobalt	mg/L	G-02D	10/16/2018	ND	0.0050	0.0040
Dissolved copper	mg/L	G-02D	10/16/2018		0.0150	0.0080
Dissolved iron	mg/L	G-02D	10/16/2018		0.2570	21.2604
Dissolved lead	mg/L	G-02D	10/16/2018		0.0001	0.0023
Dissolved magnesium	mg/L	G-02D	10/16/2018	ND	0.2000	0.3100
Dissolved manganese	mg/L	G-02D	10/16/2018		0.0052	6.1166
Dissolved nickel	mg/L	G-02D	10/16/2018		0.0150	0.0060
Dissolved potassium	mg/L	G-02D	10/16/2018		0.3100	1.6000
Dissolved selenium	mg/L	G-02D	10/16/2018	ND	0.0003	0.0025
Dissolved silver	mg/L	G-02D	10/16/2018	ND	0.0001	0.0007
Dissolved sodium	mg/L	G-02D	10/16/2018		88.6000	119.0000
Dissolved thallium	mg/L	G-02D	10/16/2018	ND	0.0001	0.0030
Dissolved vanadium	mg/L	G-02D	10/16/2018	ND	0.0100	0.0050
Dissolved zinc	mg/L	G-02D	10/16/2018	ND	0.0050	0.0120
Nitrate nitrogen	mg-N/L	G-02D	10/16/2018		1.8000	0.2100
Nitrite nitrogen	mg-N/L	G-02D	10/16/2018		0.0020	0.6000
pH	std units	G-02D	10/16/2018		7.9300	6.02 - 10.02
Sulfate	mg/L	G-02D	10/16/2018		87.0000	66.0500
Total dissolved solids	mg/L	G-02D	10/16/2018		280.0000	480.0000
Total organic carbon	mg/L	G-02D	10/16/2018		0.8600	63.0000
Alkalinity (as cacO ₃)	mg/L	G-06B	10/16/2018		270.0000	280.0000

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result		Pred. Limit
Ammonia nitrogen	mg-N/L	G-06B	10/16/2018		0.0390		0.5700
Bicarbonate	mg/L	G-06B	10/16/2018		270.0000		280.0000
Chemical oxygen demand	mg/L	G-06B	10/16/2018	ND	10.0000		160.0000
Chloride	mg/L	G-06B	10/16/2018		8.5000		9.4402
Conductivity	umhos/cm	G-06B	10/16/2018		700.0000	***	510.0000
Dissolved antimony	mg/L	G-06B	10/16/2018	ND	0.0003		0.0100
Dissolved arsenic	mg/L	G-06B	10/16/2018		0.0034		29.9523
Dissolved barium	mg/L	G-06B	10/16/2018	ND	0.0005		0.0037
Dissolved beryllium	mg/L	G-06B	10/16/2018	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-06B	10/16/2018	ND	0.0001		0.0001
Dissolved calcium	mg/L	G-06B	10/16/2018		1.1800		6.3200
Dissolved chromium	mg/L	G-06B	10/16/2018	ND	0.0050		0.0136
Dissolved cobalt	mg/L	G-06B	10/16/2018	ND	0.0050		0.0040
Dissolved copper	mg/L	G-06B	10/16/2018	ND	0.0050		0.0080
Dissolved iron	mg/L	G-06B	10/16/2018		0.1730		21.2604
Dissolved lead	mg/L	G-06B	10/16/2018		0.0001		0.0023
Dissolved magnesium	mg/L	G-06B	10/16/2018	ND	0.2000		0.3100
Dissolved manganese	mg/L	G-06B	10/16/2018		0.0120		6.1166
Dissolved nickel	mg/L	G-06B	10/16/2018		0.0070	*	0.0060
Dissolved potassium	mg/L	G-06B	10/16/2018		0.5900		1.6000
Dissolved selenium	mg/L	G-06B	10/16/2018		0.0006		0.0025
Dissolved silver	mg/L	G-06B	10/16/2018	ND	0.0001		0.0007
Dissolved sodium	mg/L	G-06B	10/16/2018		167.0000	***	119.0000
Dissolved thallium	mg/L	G-06B	10/16/2018	ND	0.0001		0.0030
Dissolved vanadium	mg/L	G-06B	10/16/2018	ND	0.0100	**	0.0050
Dissolved zinc	mg/L	G-06B	10/16/2018	ND	0.0050		0.0120
Nitrate nitrogen	mg-N/L	G-06B	10/16/2018		0.7400	***	0.2100
Nitrite nitrogen	mg-N/L	G-06B	10/16/2018	ND	0.0010		0.6000
pH	std units	G-06B	10/16/2018		7.7000		6.02 - 10.02
Sulfate	mg/L	G-06B	10/16/2018		88.0000	***	66.0500
Total dissolved solids	mg/L	G-06B	10/16/2018		460.0000		480.0000
Total organic carbon	mg/L	G-06B	10/16/2018		2.4000		63.0000
Alkalinity (as cacO3)	mg/L	G-08D2	10/16/2018		170.0000		280.0000
Ammonia nitrogen	mg-N/L	G-08D2	10/16/2018		0.1730		0.5700
Bicarbonate	mg/L	G-08D2	10/16/2018		110.0000		280.0000
Chemical oxygen demand	mg/L	G-08D2	10/16/2018	ND	10.0000		160.0000
Chloride	mg/L	G-08D2	10/16/2018		3.5000		9.4402
Conductivity	umhos/cm	G-08D2	10/16/2018		450.0000		510.0000
Dissolved antimony	mg/L	G-08D2	10/16/2018	ND	0.0003		0.0100
Dissolved arsenic	mg/L	G-08D2	10/16/2018		0.0010		29.9523
Dissolved barium	mg/L	G-08D2	10/16/2018	ND	0.0005		0.0037
Dissolved beryllium	mg/L	G-08D2	10/16/2018	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-08D2	10/16/2018	ND	0.0001		0.0001
Dissolved calcium	mg/L	G-08D2	10/16/2018		0.5600		6.3200
Dissolved chromium	mg/L	G-08D2	10/16/2018	ND	0.0050		0.0136
Dissolved cobalt	mg/L	G-08D2	10/16/2018	ND	0.0050		0.0040
Dissolved copper	mg/L	G-08D2	10/16/2018	ND	0.0050		0.0080
Dissolved iron	mg/L	G-08D2	10/16/2018		0.1160		21.2604
Dissolved lead	mg/L	G-08D2	10/16/2018	ND	0.0001		0.0023
Dissolved magnesium	mg/L	G-08D2	10/16/2018	ND	0.2000		0.3100
Dissolved manganese	mg/L	G-08D2	10/16/2018	ND	0.0050		6.1166
Dissolved nickel	mg/L	G-08D2	10/16/2018	ND	0.0050		0.0060
Dissolved potassium	mg/L	G-08D2	10/16/2018		0.3400		1.6000
Dissolved selenium	mg/L	G-08D2	10/16/2018	ND	0.0003		0.0025
Dissolved silver	mg/L	G-08D2	10/16/2018	ND	0.0001		0.0007
Dissolved sodium	mg/L	G-08D2	10/16/2018		100.0000		119.0000
Dissolved thallium	mg/L	G-08D2	10/16/2018	ND	0.0001		0.0030
Dissolved vanadium	mg/L	G-08D2	10/16/2018	ND	0.0100		0.0050
Dissolved zinc	mg/L	G-08D2	10/16/2018	ND	0.0050		0.0120
Nitrate nitrogen	mg-N/L	G-08D2	10/16/2018	ND	0.0100		0.2100
Nitrite nitrogen	mg-N/L	G-08D2	10/16/2018		0.0400		0.6000
pH	std units	G-08D2	10/16/2018		9.8100		6.02 - 10.02
Sulfate	mg/L	G-08D2	10/16/2018		45.3000		66.0500
Total dissolved solids	mg/L	G-08D2	10/16/2018		330.0000		480.0000
Total organic carbon	mg/L	G-08D2	10/16/2018		1.5000		63.0000
Alkalinity (as cacO3)	mg/L	G-09D	01/15/2019		170.0000		280.0000
Ammonia nitrogen	mg-N/L	G-09D	01/15/2019		0.1260		0.5700

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result		Pred. Limit
Bicarbonate	mg/L	G-09D	01/15/2019		150.0000		280.0000
Chemical oxygen demand	mg/L	G-09D	01/15/2019	ND	10.0000		160.0000
Chloride	mg/L	G-09D	01/15/2019		8.1000	**	9.4402
Conductivity	umhos/cm	G-09D	01/15/2019		690.0000	***	510.0000
Dissolved antimony	mg/L	G-09D	01/15/2019	ND	0.0003		0.0100
Dissolved arsenic	mg/L	G-09D	01/15/2019		0.0052		29.9523
Dissolved barium	mg/L	G-09D	01/15/2019	ND	0.0005		0.0037
Dissolved beryllium	mg/L	G-09D	01/15/2019	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-09D	01/15/2019	ND	0.0001		0.0001
Dissolved calcium	mg/L	G-09D	01/15/2019		1.6200		6.3200
Dissolved chromium	mg/L	G-09D	01/15/2019		0.0053		0.0136
Dissolved cobalt	mg/L	G-09D	01/15/2019	ND	0.0050		0.0040
Dissolved copper	mg/L	G-09D	01/15/2019		0.0150	*	0.0080
Dissolved iron	mg/L	G-09D	01/15/2019		0.1940		21.2604
Dissolved lead	mg/L	G-09D	01/15/2019		0.0007		0.0023
Dissolved magnesium	mg/L	G-09D	01/15/2019	ND	0.2000		0.3100
Dissolved manganese	mg/L	G-09D	01/15/2019		0.0308		6.1166
Dissolved nickel	mg/L	G-09D	01/15/2019		0.0070	*	0.0060
Dissolved potassium	mg/L	G-09D	01/15/2019		0.5200		1.6000
Dissolved selenium	mg/L	G-09D	01/15/2019		0.0009		0.0025
Dissolved silver	mg/L	G-09D	01/15/2019	ND	0.0001		0.0007
Dissolved sodium	mg/L	G-09D	01/15/2019		138.0000	***	119.0000
Dissolved thallium	mg/L	G-09D	01/15/2019	ND	0.0001		0.0030
Dissolved vanadium	mg/L	G-09D	01/15/2019	ND	0.0100		0.0050
Dissolved zinc	mg/L	G-09D	01/15/2019		0.0090		0.0120
Nitrate nitrogen	mg-N/L	G-09D	01/15/2019		0.1400	**	0.2100
Nitrite nitrogen	mg-N/L	G-09D	01/15/2019		0.0050		0.6000
pH	std units	G-09D	01/15/2019		9.2000		6.02 - 10.02
Sulfate	mg/L	G-09D	01/15/2019		153.0000	***	66.0500
Total dissolved solids	mg/L	G-09D	01/15/2019		480.0000	**	480.0000
Total organic carbon	mg/L	G-09D	01/15/2019		3.1000		63.0000
Alkalinity (as cacO3)	mg/L	G-10D	01/15/2019		495.0000	***	280.0000
Ammonia nitrogen	mg-N/L	G-10D	01/15/2019		0.3050		0.5700
Bicarbonate	mg/L	G-10D	01/15/2019		495.0000	***	280.0000
Chemical oxygen demand	mg/L	G-10D	01/15/2019	ND	10.0000		160.0000
Chloride	mg/L	G-10D	01/15/2019		17.7000	***	9.4402
Conductivity	umhos/cm	G-10D	01/15/2019		1650.0000	***	510.0000
Dissolved antimony	mg/L	G-10D	01/15/2019	ND	0.0003		0.0100
Dissolved arsenic	mg/L	G-10D	01/15/2019		0.0020		29.9523
Dissolved barium	mg/L	G-10D	01/15/2019	ND	0.0005		0.0037
Dissolved beryllium	mg/L	G-10D	01/15/2019	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-10D	01/15/2019	ND	0.0001		0.0001
Dissolved calcium	mg/L	G-10D	01/15/2019		24.2000	***	6.3200
Dissolved chromium	mg/L	G-10D	01/15/2019	ND	0.0050		0.0136
Dissolved cobalt	mg/L	G-10D	01/15/2019	ND	0.0050		0.0040
Dissolved copper	mg/L	G-10D	01/15/2019	ND	0.0050		0.0080
Dissolved iron	mg/L	G-10D	01/15/2019		0.6950		21.2604
Dissolved lead	mg/L	G-10D	01/15/2019	ND	0.0001		0.0023
Dissolved magnesium	mg/L	G-10D	01/15/2019		2.0400	***	0.3100
Dissolved manganese	mg/L	G-10D	01/15/2019		0.4604		6.1166
Dissolved nickel	mg/L	G-10D	01/15/2019		0.0060		0.0060
Dissolved potassium	mg/L	G-10D	01/15/2019		1.7600	***	1.6000
Dissolved selenium	mg/L	G-10D	01/15/2019		0.0011		0.0025
Dissolved silver	mg/L	G-10D	01/15/2019	ND	0.0001		0.0007
Dissolved sodium	mg/L	G-10D	01/15/2019		307.0000	***	119.0000
Dissolved thallium	mg/L	G-10D	01/15/2019	ND	0.0001		0.0030
Dissolved vanadium	mg/L	G-10D	01/15/2019	ND	0.0100		0.0050
Dissolved zinc	mg/L	G-10D	01/15/2019	ND	0.0050		0.0120
Nitrate nitrogen	mg-N/L	G-10D	01/15/2019	ND	0.0100		0.2100
Nitrite nitrogen	mg-N/L	G-10D	01/15/2019		0.0010		0.6000
pH	std units	G-10D	01/15/2019		6.8700		6.02 - 10.02
Sulfate	mg/L	G-10D	01/15/2019		416.0000	***	66.0500
Total dissolved solids	mg/L	G-10D	01/15/2019		1100.0000	***	480.0000
Total organic carbon	mg/L	G-10D	01/15/2019		4.2000		63.0000
Alkalinity (as cacO3)	mg/L	G-13D	10/17/2018		170.0000		280.0000
Ammonia nitrogen	mg-N/L	G-13D	10/17/2018		0.0450		0.5700
Bicarbonate	mg/L	G-13D	10/17/2018		160.0000		280.0000

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result	Pred. Limit
Chemical oxygen demand	mg/L	G-13D	10/17/2018	ND	10.0000	160.0000
Chloride	mg/L	G-13D	10/17/2018		9.4000	9.4402
Conductivity	umhos/cm	G-13D	10/17/2018		450.0000	510.0000
Dissolved antimony	mg/L	G-13D	10/17/2018	ND	0.0003	0.0100
Dissolved arsenic	mg/L	G-13D	10/17/2018		0.0002	29.9523
Dissolved barium	mg/L	G-13D	10/17/2018		0.0014	0.0037
Dissolved beryllium	mg/L	G-13D	10/17/2018	ND	0.0005	0.0005
Dissolved cadmium	mg/L	G-13D	10/17/2018	ND	0.0001	0.0001
Dissolved calcium	mg/L	G-13D	10/17/2018		0.6300	6.3200
Dissolved chromium	mg/L	G-13D	10/17/2018	ND	0.0050	0.0136
Dissolved cobalt	mg/L	G-13D	10/17/2018	ND	0.0050	0.0040
Dissolved copper	mg/L	G-13D	10/17/2018	ND	0.0050	0.0080
Dissolved iron	mg/L	G-13D	10/17/2018		0.0560	21.2604
Dissolved lead	mg/L	G-13D	10/17/2018	ND	0.0001	0.0023
Dissolved magnesium	mg/L	G-13D	10/17/2018	ND	0.2000	0.3100
Dissolved manganese	mg/L	G-13D	10/17/2018	ND	0.0050	6.1166
Dissolved nickel	mg/L	G-13D	10/17/2018	ND	0.0050	0.0060
Dissolved potassium	mg/L	G-13D	10/17/2018		0.4100	1.6000
Dissolved selenium	mg/L	G-13D	10/17/2018		0.0004	0.0025
Dissolved silver	mg/L	G-13D	10/17/2018	ND	0.0001	0.0007
Dissolved sodium	mg/L	G-13D	10/17/2018		101.0000	119.0000
Dissolved thallium	mg/L	G-13D	10/17/2018	ND	0.0001	0.0030
Dissolved vanadium	mg/L	G-13D	10/17/2018	ND	0.0100	0.0050
Dissolved zinc	mg/L	G-13D	10/17/2018	ND	0.0050	0.0120
Nitrate nitrogen	mg-N/L	G-13D	10/17/2018		0.0110	0.2100
Nitrite nitrogen	mg-N/L	G-13D	10/17/2018	ND	0.0010	0.6000
pH	std units	G-13D	10/17/2018		9.2900	6.02 - 10.02
Sulfate	mg/L	G-13D	10/17/2018		41.0000	66.0500
Total dissolved solids	mg/L	G-13D	10/17/2018		370.0000	480.0000
Total organic carbon	mg/L	G-13D	10/17/2018		1.2000	63.0000

* - Current value failed - awaiting verification.
** - Current value passed - previous exceedance not verified.
*** - Current value failed - exceedance verified.
**** - Current value passed - awaiting one more verification.
***** - Insufficient background data to compute prediction limit.
ND = Not Detected, Result = detection limit.

Table 5

Summary Statistics and Prediction Limits

Constituent	Units	Detect	N	Mean	SD	alpha	Factor	Pred Limit	Type	Conf
Alkalinity (as cacO ₃)	mg/L	66	66					280.0000	nonpar	0.99
Ammonia nitrogen	mg-N/L	59	59					0.5700	nonpar	0.99
Bicarbonate	mg/L	66	66					280.0000	nonpar	0.99
Chemical oxygen demand	mg/L	16	66					160.0000	nonpar	0.99
Chloride	mg/L	65	66	1.3124	0.3881	0.0100	2.4031	9.4402	lognor	
Conductivity	umhos/cm	66	66					510.0000	nonpar	0.99
Dissolved antimony	mg/L	11	66					0.0100	nonpar	0.99
Dissolved arsenic	mg/L	45	62	-5.9937	3.9005	0.0100	2.4082	29.9523	lognor	
Dissolved barium	mg/L	13	63					0.0037	nonpar	0.99
Dissolved beryllium	mg/L	0	66					0.0005	nonpar	***
Dissolved cadmium	mg/L	9	58					0.0001	nonpar	0.99
Dissolved calcium	mg/L	63	63					6.3200	nonpar	0.99
Dissolved chromium	mg/L	8	66					0.0136	nonpar	0.99
Dissolved cobalt	mg/L	4	66					0.0040	nonpar	0.99
Dissolved copper	mg/L	10	63					0.0080	nonpar	0.99
Dissolved iron	mg/L	30	60	-1.7669	2.0007	0.0100	2.4110	21.2604	lognor	
Dissolved lead	mg/L	20	66					0.0023	nonpar	0.99
Dissolved magnesium	mg/L	40	62					0.3100	nonpar	0.99
Dissolved manganese	mg/L	43	57	-4.2557	2.5114	0.0100	2.4157	6.1166	lognor	
Dissolved nickel	mg/L	2	65					0.0060	nonpar	0.99
Dissolved potassium	mg/L	62	66					1.6000	nonpar	0.99
Dissolved selenium	mg/L	16	65					0.0025	nonpar	0.99
Dissolved silver	mg/L	6	62					0.0007	nonpar	0.99
Dissolved sodium	mg/L	63	63					119.0000	nonpar	0.99
Dissolved thallium	mg/L	7	65					0.0030	nonpar	0.99
Dissolved vanadium	mg/L	0	66					0.0050	nonpar	***
Dissolved zinc	mg/L	17	65					0.0120	nonpar	0.99
Nitrate nitrogen	mg-N/L	14	65					0.2100	nonpar	0.99
Nitrite nitrogen	mg-N/L	29	59					0.6000	nonpar	0.99
pH	std units	65	65					6.02- 10.02	nonpar	0.99
Sulfate	mg/L	65	65					66.0500	nonpar	0.99
Total dissolved solids	mg/L	66	66					480.0000	nonpar	0.99
Total organic carbon	mg/L	62	66					63.0000	nonpar	0.99

Conf = confidence level for passing initial test or one of two verification resamples at all downgradient wells for a single constituent (nonparametric test only).

* - Insufficient Data.

** - Calculated limit raised to Manual Reporting Limit.

*** - Nonparametric limit based on ND value.

For transformed data, mean and SD in transformed units and prediction limit in original units.

All sample sizes and statistics are based on outlier free data.

For nonparametric limits, median reporting limits are substituted for extreme reporting limit values.

Groundwater Analytical Summary - Deep Wells: Second Quarter 2019
Cathcart Landfill, Snohomish County, WA

	Statistical Method	Number of Samples	Number of Detects	Prediction Limit	Primary GW Stds 173-200	Downgradient Wells																				Upgradient Wells																								
						G-01D				G-02D				G-06B				G-08D2				G-09D				G-10D				G-13D				G-14D				G-24D												
						4/24/19	D	V	Tr	Ch	4/23/19	D	V	Tr	Ch	4/24/19	D	V	Tr	Ch	4/23/19	D	V	Tr	Ch	4/23/19	D	V	Tr	Ch	4/23/19	D	V	Tr	Ch	4/24/19	D	V	Tr	Ch	4/23/19	D	V	Tr	Ch	4/24/19	D	V	Tr	Ch
CONVENTIONAL CHEMISTRY PARAMETERS (mg/L)																																																		
Alkalinity (as CaCO3)	nonpar	68	68	280	--	230					82					210					180					190					480		V			170					220					200				
Ammonia Nitrogen	nonpar	61	61	0.57	--	0.142					0.02	U				0.152					0.159					0.118					0.332					0.082			D	N	0.133			D	N	0.103				
Bicarbonate	nonpar	68	68	280	--	200					82					210					150					180					480		V			130					210					200				
Calcium, Dissolved	nonpar	65	65	6.32	--	1.47					0.47		D	N		29.6		E	D	N	1.18					1.26			D	N	21.6		V	D	N	0.53					0.79					0.52				Y
Chemical Oxygen Demand	nonpar	68	16	160	--	10	U				10	U				12					10	U				10	U				10	U				10	U				10	U								
Chloride	lognor	68	67	9.3634	250	6.72			D	N	5.8			D	Y	8.35			D	N	2.92			D	N	5.46			D	N	15.0		V	D	Y	8.79		P			1.91					3.32			D	N
Conductivity (umhos/cm)	nonpar	68	68	510	700	590		V	D	Y	350			D	N	400		P	D	N	430					590		V	Y	1400		V			420					450					450					
Magnesium, Dissolved	nonpar	65	42	2.33	--	0.2	U				0.2	U				18.2		E			0.4					0.2	U				2.01			D	N	0.2	U				0.37					0.2	U			
Nitrate Nitrogen (mg-N/L)	nonpar	67	14	0.21	10	0.01	U				0.68		V	D	N	0.01	U	P		Y	0.017					0.13					0.01	U				0.01	U				0.01	U								
Nitrite Nitrogen (mg-N/L)	nonpar	61	30	0.6	1	0.016					0.003					0.008					0.006					0.004					0.002	U				0.003					0.002					0.002	U			
pH (std units)	nonpar	67	67	6.02-10.02	6.5-8.5	9.18					7.53			Y		7.87					9.90					9.27					6.92					9.30					9.85					8.59			I	Y
Potassium, Dissolved	nonpar	68	62	1.6	--	0.26			I	N	0.24			Y	1.57			I	N	0.35			I	N	0.42					1.72		V			0.2	U		I	N	0.2	U				0.2	U				
Sodium, Dissolved	normal	65	65	125.7068	20	156		V			84.4			D	N	10.8		P	D	N	109					165		V			382		V	Y	99.6					120					111					
Sulfate	nonpar	67	67	66.05	250	52.3			D	N	77.3		V			25		P	D	N	41.0					118		V			319		V	Y	36.8			D	N	2.76					40.5					
Total Dissolved Solids	nonpar	68	68	480	500	420					240			D	N	270			D	N	290					400					920		V			300					300					320				
Total Organic Carbon	nonpar	68	64	63	--	26.0					3.9					29.0					4.2					5.7					6.0			D	Y	3.0					4.4					2.0				
DISSOLVED METALS EPA Methods 200.7/200.8 (mg/L)																																																		
Antimony	nonpar	68	11	0.01	0.006	0.0003	U				0.0003	U				0.0003	U				0.0003	U				0.0003	U				0.0003	U				0.0003	U				0.0003	U								
Arsenic	lognor	64	47	0.0021	0.00005	0.000301					0.00278					0.0162			I	N	0.00156					0.00397					0.00124					0.000206					0.000697					0.000095				
Barium	nonpar	65	14	0.0049	1	0.0021					0.0016					0.0035					0.0046		E			0.0005	U				0.0016					0.0005	U				0.0035					0.0005	U			
Beryllium	nonpar	68	0	0.0005	0.004	0.0005	U				0.0005	U				0.0005	U				0.0005	U				0.0005	U				0.0005	U				0.0005	U				0.0005	U								
Cadmium	nonpar	60	9	0.0001	0.005	0.00005	U				0.00005	U				0.000059					0.00005	U				0.00005	U				0.00005	U				0.00005	U				0.00005	U								
Chromium	nonpar	68	8	0.0106	0.05	0.005	U				0.005	U				0.0055					0.005	U				0.005	U				0.005	U				0.005	U				0.005	U								
Cobalt	nonpar	68	4	0.008	--	0.005	U				0.005	U				0.012			E		0.005	U				0.005	U				0.005	U				0.005	U				0.005	U								
Copper	nonpar	65	10	0.008	1	0.005	U				0.013		E			0.005	U				0.005	U				0.009		E			0.005	U				0.005	U				0.005	U								
Iron	lognor	62	31	0.1076	0.3	0.225					0.22		I	N		14.7			I	N	1.3			I	Y	0.045					0.662					0.01	U		Y		0.959			I	Y	0.01	U			
Lead	nonpar	68	21	0.0023	0.05	0.000207					0.155					0.0001	U				0.000271					0.000702			D	Y	0.00026					0.0001	U				0.000145					0.0001	U			
Manganese	lognor	59	44	0.0183	0.05	0.0059					0.0053					4.18					0.0366					0.0109					0.3847			D	N	0.005	U				0.0152					0.005	U			Y
Nickel	nonpar	67	2	0.026	0.1	0.005	U				0.009		E			0.014			E		0.005	U				0.007		E			0.005	U				0.005	U				0.005	U								
Selenium	nonpar	67	16	0.004	0.01	0.0003	U				0.0003	U				0.00041					0.0003	U				0.00051					0.00056					0.0003	U				0.0003	U								
Silver	nonpar	64	6	0.0007	0.05	0.0001	U				0.0001	U				0.0001	U				0.0001	U				0.0001	U				0.0001	U				0.0001	U				0.0001	U								
Thallium	nonpar	67	7	0.001	0.002	0.00005	U				0.00005	U				0.00005	U				0.00005	U				0.00005	U				0.00005	U				0.00005	U				0.00005	U								
Vanadium	nonpar	68	0	0.008	--	0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U								
Zinc	nonpar	67	17	0.008	5	0.005	U				0.005	U				0.007					0.007					0.008					0.005	U				0.005	U				0.005	U								
TOTAL METALS EPA Methods 200.7/200.8 (mg/L)																																																		
Antimony					0.006	0.0003	U				0.0003	U				0.0003	U				0.0003	U				0.0003	U				0.0003	U				0.0003	U				0.0003	U								
Arsenic					0.00005	0.000313					0.00366					0.00705					0.0011					0.00321					0.00127					0.000184					0.000798					0.00005	U			
Barium					1	0.0161					0.0051					0.0051					0.0414					0.005	U				0.005	U				0.005	U				0.0317					0.005	U			
Beryllium					0.004	0.0005	U				0.0005	U				0.0005	U				0.0005	U				0.0005	U				0.0005	U				0.0005	U				0.0005	U								
Cadmium					0.005	0.00005	U																																											

Groundwater Analytical Summary - Deep Wells: Second Quarter 2019
Cathcart Landfill, Snohomish County, WA

Statistical Method	Number of Samples	Number of Detects	Prediction Limit	Primary GW Stds 173-200	Downgradient Wells																				Upgradient Wells															
					G-01D				G-02D				G-06B				G-08D2				G-09D				G-10D				G-13D				G-14D				G-24D			
					4/24/19	D	V	Tr	Ch	4/23/19	D	V	Tr	Ch	4/24/19	D	V	Tr	Ch	4/23/19	D	V	Tr	Ch	4/23/19	D	V	Tr	Ch	4/23/19	D	V	Tr	Ch	4/24/19	D	V	Tr	Ch	4/24/19
VOLATILE ORGANIC COMPOUNDS (VOCs) EPA Method 8260 (µg/L) (cont.)																																								
1,1-Dichloroethylene				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				
1,2,3-Trichloropropane				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				
1,2-Dibromo-3-chloropropane				0.2	5	U				5	U				5	U				5	U				5	U				5	U				5	U				
1,2-Dibromoethane				0.001	0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				
1,2-Dichlorobenzene				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				
1,2-Dichloroethane				0.5	0.5	U				0.5	U				0.5	U				0.5	U				0.5	U				0.5	U				0.5	U				
1,2-Dichloropropane				0.6	0.6	U				0.6	U				0.6	U				0.6	U				0.6	U				0.6	U				0.6	U				
1,4-Dichlorobenzene				4	1	U				1	U				1	U				1	U				1	U				1	U				1	U				
2-Butanone				--	5	U				5	U				5	U				5	U				5	U				5	U				5	U				
2-Hexanone				--	5	U				5	U				5	U				5	U				5	U				5	U				5	U				
4-Methyl-2-Pentanone (MIBK)				--	5	U				5	U				5	U				5	U				5	U				5	U				5	U				
Acetone				--	5	U				5	U				5	U				5	U				5	U				5	U				5	U				
Acrylonitrile				0.07	0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				
Benzene				1	1	U				1	U				1	U				1	U				1	U				1	U				1	U				
Bromodichloromethane				0.3	0.3	U				0.3	U				0.3	U				0.3	U				0.3	U				0.3	U				0.3	U				
Bromoform				5	1	U				1	U				1	U				1	U				1	U				1	U				1	U				
Bromomethane				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				
Carbon Disulfide				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				
Carbon Tetrachloride				0.3	0.3	U				0.3	U				0.3	U				0.3	U				0.3	U				0.3	U				0.3	U				
Chlorobenzene				--	0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				
Chlorodibromomethane				0.5	0.5	U				0.5	U				0.5	U				0.5	U				0.5	U				0.5	U				0.5	U				
Chloroethane				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				
Chloroform				7	1	U				1	U				1	U				1	U				1	U				1	U				1	U				
Chloromethane				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				
cis-1,2-Dichloroethene				--	0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				
cis-1,3-Dichloropropene				0.2	0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				
Dibromomethane				--	0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				
Ethyl Benzene				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				
m,p-Xylene				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				
Methyl Iodide				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				
Methylene Chloride				5	2.0	U				2.0	U				2.0	U				2.0	U				2.0	U				2.0	U				2.0	U				
o-Xylene				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				
Styrene				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				
Tetrachloroethylene				0.8	0.8	U				0.8	U				0.8	U				0.8	U				0.8	U				0.8	U				0.8	U				
Toluene				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				
trans-1,2-Dichloroethene				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				
trans-1,3-Dichloropropene				0.2	0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				
trans-1,4-Dichloro-2-butene				--	5	U				5	U				5	U				5	U				5	U				5	U				5	U				
Trichlorethene (1,1,2-Trichloroethylene)				3	1	U				1	U				1	U				1	U				1	U				1	U				1	U				
Trichlorofluoromethane				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				
Vinyl Acetate				--	5	U				5	U				5	U				5	U				5	U				5	U				5	U				
Vinyl Chloride				0.02	0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				

D: U = Indicates compound was not detected at the given reporting limit; X indicates that the compound was detected in the trip blank and contamination is suspected.
V: E= Exceedance, waiting verification based on subsequent lab data; V= Exceedance verified based on previous lab data; P=Passed, previous exceedance not verified based on current lab data.
Tr: I=Increasing Trend, D=Decreasing Trend;
Ch: Y indicates a change in trend from previous quarter; N means no change in trend.
Values in purple exceed the prediction limit; indicates that a value exceeded the Groundwater Standards
The groundwater standards listed are based on the Washington Administrative Code (WAC) 173-200 groundwater limits as modified by the TMS 91-11 standards.

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result	Pred. Limit
Alkalinity (as cacO3)	mg/L	G-01D	04/24/2019		230.0000	280.0000
Ammonia nitrogen	mg-N/L	G-01D	04/24/2019		0.1420	0.5700
Bicarbonate	mg/L	G-01D	04/24/2019		200.0000	280.0000
Chemical oxygen demand	mg/L	G-01D	04/24/2019	ND	10.0000	160.0000
Chloride	mg/L	G-01D	04/24/2019		6.7200	9.3634
Conductivity	umhos/cm	G-01D	04/24/2019		590.0000	510.0000
Dissolved antimony	mg/L	G-01D	04/24/2019	ND	0.0003	0.0100
Dissolved arsenic	mg/L	G-01D	04/24/2019		0.0003	25.2225
Dissolved barium	mg/L	G-01D	04/24/2019		0.0021	0.0037
Dissolved beryllium	mg/L	G-01D	04/24/2019	ND	0.0005	0.0005
Dissolved cadmium	mg/L	G-01D	04/24/2019	ND	0.0001	0.0001
Dissolved calcium	mg/L	G-01D	04/24/2019		1.4700	6.3200
Dissolved chromium	mg/L	G-01D	04/24/2019	ND	0.0050	0.0136
Dissolved cobalt	mg/L	G-01D	04/24/2019	ND	0.0050	0.0040
Dissolved copper	mg/L	G-01D	04/24/2019	ND	0.0050	0.0080
Dissolved iron	mg/L	G-01D	04/24/2019		0.2250	21.8371
Dissolved lead	mg/L	G-01D	04/24/2019		0.0002	0.0023
Dissolved magnesium	mg/L	G-01D	04/24/2019	ND	0.2000	2.3300
Dissolved manganese	mg/L	G-01D	04/24/2019		0.0059	6.8059
Dissolved nickel	mg/L	G-01D	04/24/2019	ND	0.0050	0.0060
Dissolved potassium	mg/L	G-01D	04/24/2019		0.2600	1.6000
Dissolved selenium	mg/L	G-01D	04/24/2019	ND	0.0003	0.0025
Dissolved silver	mg/L	G-01D	04/24/2019	ND	0.0001	0.0007
Dissolved sodium	mg/L	G-01D	04/24/2019		156.0000	125.7068
Dissolved thallium	mg/L	G-01D	04/24/2019	ND	0.0001	0.0030
Dissolved thallium	mg/L	G-01D	04/24/2019	ND	0.0100	0.0050
Dissolved zinc	mg/L	G-01D	04/24/2019	ND	0.0050	0.0120
Nitrate nitrogen	mg-N/L	G-01D	04/24/2019	ND	0.0100	0.2100
Nitrite nitrogen	mg-N/L	G-01D	04/24/2019		0.0160	0.6000
pH	std units	G-01D	04/24/2019		9.1800	6.02 - 10.02
Sulfate	mg/L	G-01D	04/24/2019		52.3000	66.0500
Total dissolved solids	mg/L	G-01D	04/24/2019		420.0000	480.0000
Total organic carbon	mg/L	G-01D	04/24/2019		26.0000	63.0000
Alkalinity (as cacO3)	mg/L	G-02D	04/23/2019		82.0000	280.0000
Ammonia nitrogen	mg-N/L	G-02D	04/23/2019	ND	0.0200	0.5700
Bicarbonate	mg/L	G-02D	04/23/2019		82.0000	280.0000
Chemical oxygen demand	mg/L	G-02D	04/23/2019	ND	10.0000	160.0000
Chloride	mg/L	G-02D	04/23/2019		5.8000	9.3634
Conductivity	umhos/cm	G-02D	04/23/2019		350.0000	510.0000
Dissolved antimony	mg/L	G-02D	04/23/2019	ND	0.0003	0.0100
Dissolved arsenic	mg/L	G-02D	04/23/2019		0.0028	25.2225
Dissolved barium	mg/L	G-02D	04/23/2019		0.0016	0.0037
Dissolved beryllium	mg/L	G-02D	04/23/2019	ND	0.0005	0.0005
Dissolved cadmium	mg/L	G-02D	04/23/2019	ND	0.0001	0.0001
Dissolved calcium	mg/L	G-02D	04/23/2019		0.4700	6.3200
Dissolved chromium	mg/L	G-02D	04/23/2019	ND	0.0050	0.0136
Dissolved cobalt	mg/L	G-02D	04/23/2019	ND	0.0050	0.0040
Dissolved copper	mg/L	G-02D	04/23/2019		0.0130	0.0080
Dissolved iron	mg/L	G-02D	04/23/2019		0.2200	21.8371
Dissolved lead	mg/L	G-02D	04/23/2019		0.0002	0.0023
Dissolved magnesium	mg/L	G-02D	04/23/2019	ND	0.2000	2.3300
Dissolved manganese	mg/L	G-02D	04/23/2019		0.0053	6.8059
Dissolved nickel	mg/L	G-02D	04/23/2019		0.0090	0.0060
Dissolved potassium	mg/L	G-02D	04/23/2019		0.2400	1.6000
Dissolved selenium	mg/L	G-02D	04/23/2019	ND	0.0003	0.0025
Dissolved silver	mg/L	G-02D	04/23/2019	ND	0.0001	0.0007
Dissolved sodium	mg/L	G-02D	04/23/2019		84.4000	125.7068
Dissolved thallium	mg/L	G-02D	04/23/2019	ND	0.0001	0.0030
Dissolved vanadium	mg/L	G-02D	04/23/2019	ND	0.0100	0.0050
Dissolved zinc	mg/L	G-02D	04/23/2019	ND	0.0050	0.0120
Nitrate nitrogen	mg-N/L	G-02D	04/23/2019		0.6800	0.2100
Nitrite nitrogen	mg-N/L	G-02D	04/23/2019		0.0030	0.6000
pH	std units	G-02D	04/23/2019		7.5300	6.02 - 10.02
Sulfate	mg/L	G-02D	04/23/2019		77.3000	66.0500
Total dissolved solids	mg/L	G-02D	04/23/2019		240.0000	480.0000
Total organic carbon	mg/L	G-02D	04/23/2019		3.9000	63.0000
Alkalinity (as cacO3)	mg/L	G-06B	04/24/2019		210.0000	280.0000

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result		Pred. Limit
Ammonia nitrogen	mg-N/L	G-06B	04/24/2019		0.1520		0.5700
Bicarbonate	mg/L	G-06B	04/24/2019		210.0000		280.0000
Chemical oxygen demand	mg/L	G-06B	04/24/2019		12.0000		160.0000
Chloride	mg/L	G-06B	04/24/2019		8.3500		9.3634
Conductivity	umhos/cm	G-06B	04/24/2019		400.0000	**	510.0000
Dissolved antimony	mg/L	G-06B	04/24/2019	ND	0.0003		0.0100
Dissolved arsenic	mg/L	G-06B	04/24/2019		0.0162		25.2225
Dissolved barium	mg/L	G-06B	04/24/2019		0.0035		0.0037
Dissolved beryllium	mg/L	G-06B	04/24/2019	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-06B	04/24/2019		0.0001		0.0001
Dissolved calcium	mg/L	G-06B	04/24/2019		29.6000	*	6.3200
Dissolved chromium	mg/L	G-06B	04/24/2019		0.0055		0.0136
Dissolved cobalt	mg/L	G-06B	04/24/2019		0.0120	*	0.0040
Dissolved copper	mg/L	G-06B	04/24/2019	ND	0.0050		0.0080
Dissolved iron	mg/L	G-06B	04/24/2019		14.7000		21.8371
Dissolved lead	mg/L	G-06B	04/24/2019	ND	0.0001		0.0023
Dissolved magnesium	mg/L	G-06B	04/24/2019		18.2000	*	2.3300
Dissolved manganese	mg/L	G-06B	04/24/2019		4.1800		6.8059
Dissolved nickel	mg/L	G-06B	04/24/2019		0.0140	*	0.0060
Dissolved potassium	mg/L	G-06B	04/24/2019		1.5700		1.6000
Dissolved selenium	mg/L	G-06B	04/24/2019		0.0004		0.0025
Dissolved silver	mg/L	G-06B	04/24/2019	ND	0.0001		0.0007
Dissolved sodium	mg/L	G-06B	04/24/2019		10.8000	**	125.7068
Dissolved thallium	mg/L	G-06B	04/24/2019	ND	0.0001		0.0030
Dissolved vanadium	mg/L	G-06B	04/24/2019	ND	0.0100		0.0050
Dissolved zinc	mg/L	G-06B	04/24/2019		0.0070		0.0120
Nitrate nitrogen	mg-N/L	G-06B	04/24/2019	ND	0.0100	**	0.2100
Nitrite nitrogen	mg-N/L	G-06B	04/24/2019		0.0080		0.6000
pH	std units	G-06B	04/24/2019		7.8700		6.02 - 10.02
Sulfate	mg/L	G-06B	04/24/2019		25.0000	**	66.0500
Total dissolved solids	mg/L	G-06B	04/24/2019		270.0000		480.0000
Total organic carbon	mg/L	G-06B	04/24/2019		29.0000		63.0000
Alkalinity (as cacO3)	mg/L	G-08D2	04/23/2019		180.0000		280.0000
Ammonia nitrogen	mg-N/L	G-08D2	04/23/2019		0.1590		0.5700
Bicarbonate	mg/L	G-08D2	04/23/2019		150.0000		280.0000
Chemical oxygen demand	mg/L	G-08D2	04/23/2019	ND	10.0000		160.0000
Chloride	mg/L	G-08D2	04/23/2019		2.9200		9.3634
Conductivity	umhos/cm	G-08D2	04/23/2019		430.0000		510.0000
Dissolved antimony	mg/L	G-08D2	04/23/2019	ND	0.0003		0.0100
Dissolved arsenic	mg/L	G-08D2	04/23/2019		0.0016		25.2225
Dissolved barium	mg/L	G-08D2	04/23/2019		0.0046	*	0.0037
Dissolved beryllium	mg/L	G-08D2	04/23/2019	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-08D2	04/23/2019	ND	0.0001		0.0001
Dissolved calcium	mg/L	G-08D2	04/23/2019		1.1800		6.3200
Dissolved chromium	mg/L	G-08D2	04/23/2019	ND	0.0050		0.0136
Dissolved cobalt	mg/L	G-08D2	04/23/2019	ND	0.0050		0.0040
Dissolved copper	mg/L	G-08D2	04/23/2019	ND	0.0050		0.0080
Dissolved iron	mg/L	G-08D2	04/23/2019		1.3000		21.8371
Dissolved lead	mg/L	G-08D2	04/23/2019		0.0003		0.0023
Dissolved magnesium	mg/L	G-08D2	04/23/2019		0.4000		2.3300
Dissolved manganese	mg/L	G-08D2	04/23/2019		0.0366		6.8059
Dissolved nickel	mg/L	G-08D2	04/23/2019	ND	0.0050		0.0060
Dissolved potassium	mg/L	G-08D2	04/23/2019		0.3500		1.6000
Dissolved selenium	mg/L	G-08D2	04/23/2019	ND	0.0003		0.0025
Dissolved silver	mg/L	G-08D2	04/23/2019	ND	0.0001		0.0007
Dissolved sodium	mg/L	G-08D2	04/23/2019		109.0000		125.7068
Dissolved thallium	mg/L	G-08D2	04/23/2019	ND	0.0001		0.0030
Dissolved vanadium	mg/L	G-08D2	04/23/2019	ND	0.0100		0.0050
Dissolved zinc	mg/L	G-08D2	04/23/2019		0.0070		0.0120
Nitrate nitrogen	mg-N/L	G-08D2	04/23/2019		0.0170		0.2100
Nitrite nitrogen	mg-N/L	G-08D2	04/23/2019		0.0060		0.6000
pH	std units	G-08D2	04/23/2019		9.9000		6.02 - 10.02
Sulfate	mg/L	G-08D2	04/23/2019		41.0000		66.0500
Total dissolved solids	mg/L	G-08D2	04/23/2019		290.0000		480.0000
Total organic carbon	mg/L	G-08D2	04/23/2019		4.2000		63.0000
Alkalinity (as cacO3)	mg/L	G-09D	04/23/2019		190.0000		280.0000
Ammonia nitrogen	mg-N/L	G-09D	04/23/2019		0.1180		0.5700

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result		Pred. Limit
Bicarbonate	mg/L	G-09D	04/23/2019		180.0000		280.0000
Chemical oxygen demand	mg/L	G-09D	04/23/2019	ND	10.0000		160.0000
Chloride	mg/L	G-09D	04/23/2019		5.4600		9.3634
Conductivity	umhos/cm	G-09D	04/23/2019		590.0000	***	510.0000
Dissolved antimony	mg/L	G-09D	04/23/2019	ND	0.0003		0.0100
Dissolved arsenic	mg/L	G-09D	04/23/2019		0.0040		25.2225
Dissolved barium	mg/L	G-09D	04/23/2019	ND	0.0005		0.0037
Dissolved beryllium	mg/L	G-09D	04/23/2019	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-09D	04/23/2019	ND	0.0001		0.0001
Dissolved calcium	mg/L	G-09D	04/23/2019		1.2600		6.3200
Dissolved chromium	mg/L	G-09D	04/23/2019	ND	0.0050		0.0136
Dissolved cobalt	mg/L	G-09D	04/23/2019	ND	0.0050		0.0040
Dissolved copper	mg/L	G-09D	04/23/2019		0.0090	*	0.0080
Dissolved iron	mg/L	G-09D	04/23/2019		0.0450		21.8371
Dissolved lead	mg/L	G-09D	04/23/2019		0.0007		0.0023
Dissolved magnesium	mg/L	G-09D	04/23/2019	ND	0.2000		2.3300
Dissolved manganese	mg/L	G-09D	04/23/2019		0.0109		6.8059
Dissolved nickel	mg/L	G-09D	04/23/2019		0.0070	*	0.0060
Dissolved potassium	mg/L	G-09D	04/23/2019		0.4200		1.6000
Dissolved selenium	mg/L	G-09D	04/23/2019		0.0005		0.0025
Dissolved silver	mg/L	G-09D	04/23/2019	ND	0.0001		0.0007
Dissolved sodium	mg/L	G-09D	04/23/2019		165.0000	***	125.7068
Dissolved thallium	mg/L	G-09D	04/23/2019	ND	0.0001		0.0030
Dissolved vanadium	mg/L	G-09D	04/23/2019	ND	0.0100		0.0050
Dissolved zinc	mg/L	G-09D	04/23/2019		0.0080		0.0120
Nitrate nitrogen	mg-N/L	G-09D	04/23/2019		0.1300		0.2100
Nitrite nitrogen	mg-N/L	G-09D	04/23/2019		0.0040		0.6000
pH	std units	G-09D	04/23/2019		9.2700		6.02 - 10.02
Sulfate	mg/L	G-09D	04/23/2019		118.0000	***	66.0500
Total dissolved solids	mg/L	G-09D	04/23/2019		400.0000		480.0000
Total organic carbon	mg/L	G-09D	04/23/2019		5.7000		63.0000
Alkalinity (as cacO3)	mg/L	G-10D	04/23/2019		480.0000	***	280.0000
Ammonia nitrogen	mg-N/L	G-10D	04/23/2019		0.3320		0.5700
Bicarbonate	mg/L	G-10D	04/23/2019		480.0000	***	280.0000
Chemical oxygen demand	mg/L	G-10D	04/23/2019	ND	10.0000		160.0000
Chloride	mg/L	G-10D	04/23/2019		15.0000	***	9.3634
Conductivity	umhos/cm	G-10D	04/23/2019		1400.0000	***	510.0000
Dissolved antimony	mg/L	G-10D	04/23/2019	ND	0.0003		0.0100
Dissolved arsenic	mg/L	G-10D	04/23/2019		0.0012		25.2225
Dissolved barium	mg/L	G-10D	04/23/2019		0.0016		0.0037
Dissolved beryllium	mg/L	G-10D	04/23/2019	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-10D	04/23/2019	ND	0.0001		0.0001
Dissolved calcium	mg/L	G-10D	04/23/2019		21.6000	***	6.3200
Dissolved chromium	mg/L	G-10D	04/23/2019	ND	0.0050		0.0136
Dissolved cobalt	mg/L	G-10D	04/23/2019	ND	0.0050		0.0040
Dissolved copper	mg/L	G-10D	04/23/2019	ND	0.0050		0.0080
Dissolved iron	mg/L	G-10D	04/23/2019		0.6620		21.8371
Dissolved lead	mg/L	G-10D	04/23/2019		0.0003		0.0023
Dissolved magnesium	mg/L	G-10D	04/23/2019		2.0100		2.3300
Dissolved manganese	mg/L	G-10D	04/23/2019		0.3847		6.8059
Dissolved nickel	mg/L	G-10D	04/23/2019	ND	0.0050		0.0060
Dissolved potassium	mg/L	G-10D	04/23/2019		1.7200	***	1.6000
Dissolved selenium	mg/L	G-10D	04/23/2019		0.0006		0.0025
Dissolved silver	mg/L	G-10D	04/23/2019	ND	0.0001		0.0007
Dissolved sodium	mg/L	G-10D	04/23/2019		382.0000	***	125.7068
Dissolved thallium	mg/L	G-10D	04/23/2019	ND	0.0001		0.0030
Dissolved vanadium	mg/L	G-10D	04/23/2019	ND	0.0100		0.0050
Dissolved zinc	mg/L	G-10D	04/23/2019	ND	0.0050		0.0120
Nitrate nitrogen	mg-N/L	G-10D	04/23/2019	ND	0.0100		0.2100
Nitrite nitrogen	mg-N/L	G-10D	04/23/2019	ND	0.0020		0.6000
pH	std units	G-10D	04/23/2019		6.9200		6.02 - 10.02
Sulfate	mg/L	G-10D	04/23/2019		319.0000	***	66.0500
Total dissolved solids	mg/L	G-10D	04/23/2019		920.0000	***	480.0000
Total organic carbon	mg/L	G-10D	04/23/2019		6.0000		63.0000
Alkalinity (as cacO3)	mg/L	G-13D	04/24/2019		170.0000		280.0000
Ammonia nitrogen	mg-N/L	G-13D	04/24/2019		0.0820		0.5700
Bicarbonate	mg/L	G-13D	04/24/2019		130.0000		280.0000

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result		Pred. Limit
Chemical oxygen demand	mg/L	G-13D	04/24/2019	ND	10.0000		160.0000
Chloride	mg/L	G-13D	04/24/2019		8.7900	**	9.3634
Conductivity	umhos/cm	G-13D	04/24/2019		420.0000		510.0000
Dissolved antimony	mg/L	G-13D	04/24/2019	ND	0.0003		0.0100
Dissolved arsenic	mg/L	G-13D	04/24/2019		0.0002		25.2225
Dissolved barium	mg/L	G-13D	04/24/2019	ND	0.0005		0.0037
Dissolved beryllium	mg/L	G-13D	04/24/2019	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-13D	04/24/2019	ND	0.0001		0.0001
Dissolved calcium	mg/L	G-13D	04/24/2019		0.5300		6.3200
Dissolved chromium	mg/L	G-13D	04/24/2019	ND	0.0050		0.0136
Dissolved cobalt	mg/L	G-13D	04/24/2019	ND	0.0050		0.0040
Dissolved copper	mg/L	G-13D	04/24/2019	ND	0.0050		0.0080
Dissolved iron	mg/L	G-13D	04/24/2019	ND	0.0100		21.8371
Dissolved lead	mg/L	G-13D	04/24/2019	ND	0.0001		0.0023
Dissolved magnesium	mg/L	G-13D	04/24/2019	ND	0.2000		2.3300
Dissolved manganese	mg/L	G-13D	04/24/2019	ND	0.0050		6.8059
Dissolved nickel	mg/L	G-13D	04/24/2019	ND	0.0050		0.0060
Dissolved potassium	mg/L	G-13D	04/24/2019	ND	0.2000		1.6000
Dissolved selenium	mg/L	G-13D	04/24/2019	ND	0.0003		0.0025
Dissolved silver	mg/L	G-13D	04/24/2019	ND	0.0001		0.0007
Dissolved sodium	mg/L	G-13D	04/24/2019		99.6000		125.7068
Dissolved thallium	mg/L	G-13D	04/24/2019	ND	0.0001		0.0030
Dissolved vanadium	mg/L	G-13D	04/24/2019	ND	0.0100		0.0050
Dissolved zinc	mg/L	G-13D	04/24/2019	ND	0.0050		0.0120
Nitrate nitrogen	mg-N/L	G-13D	04/24/2019	ND	0.0100		0.2100
Nitrite nitrogen	mg-N/L	G-13D	04/24/2019		0.0030		0.6000
pH	std units	G-13D	04/24/2019		9.3000		6.02 - 10.02
Sulfate	mg/L	G-13D	04/24/2019		36.8000		66.0500
Total dissolved solids	mg/L	G-13D	04/24/2019		300.0000		480.0000
Total organic carbon	mg/L	G-13D	04/24/2019		3.0000		63.0000

* - Current value failed - awaiting verification.

** - Current value passed - previous exceedance not verified.

*** - Current value failed - exceedance verified.

**** - Current value passed - awaiting one more verification.

***** - Insufficient background data to compute prediction limit.

ND = Not Detected, Result = detection limit.

Table 5

Summary Statistics and Prediction Limits

Constituent	Units	Detect	N	Mean	SD	alpha	Factor	Pred Limit	Type	Conf
Alkalinity (as caco3)	mg/L	68	68					280.0000	nonpar	0.99
Ammonia nitrogen	mg-N/L	61	61					0.5700	nonpar	0.99
Bicarbonate	mg/L	68	68					280.0000	nonpar	0.99
Chemical oxygen demand	mg/L	16	68					160.0000	nonpar	0.99
Chloride	mg/L	67	68	1.3018	0.3895	0.0100	2.4007	9.3634	lognor	
Conductivity	umhos/cm	68	68					510.0000	nonpar	0.99
Dissolved antimony	mg/L	11	68					0.0100	nonpar	0.99
Dissolved arsenic	mg/L	47	64	-6.0635	3.8624	0.0100	2.4056	25.2225	lognor	
Dissolved barium	mg/L	14	65					0.0037	nonpar	0.99
Dissolved beryllium	mg/L	0	68					0.0005	nonpar	***
Dissolved cadmium	mg/L	9	60					0.0001	nonpar	0.99
Dissolved calcium	mg/L	65	65					6.3200	nonpar	0.99
Dissolved chromium	mg/L	8	68					0.0136	nonpar	0.99
Dissolved cobalt	mg/L	4	68					0.0040	nonpar	0.99
Dissolved copper	mg/L	10	65					0.0080	nonpar	0.99
Dissolved iron	mg/L	31	62	-1.7121	1.9914	0.0100	2.4082	21.8371	lognor	
Dissolved lead	mg/L	21	68					0.0023	nonpar	0.99
Dissolved magnesium	mg/L	42	65					2.3300	nonpar	0.99
Dissolved manganese	mg/L	44	59	-4.1840	2.5292	0.0100	2.4125	6.8059	lognor	
Dissolved nickel	mg/L	2	67					0.0060	nonpar	0.99
Dissolved potassium	mg/L	62	68					1.6000	nonpar	0.99
Dissolved selenium	mg/L	16	67					0.0025	nonpar	0.99
Dissolved silver	mg/L	6	64					0.0007	nonpar	0.99
Dissolved sodium	mg/L	65	65	107.8431	7.4299	0.0100	2.4043	125.7068	normal	
Dissolved thallium	mg/L	7	67					0.0030	nonpar	0.99
Dissolved vanadium	mg/L	0	68					0.0050	nonpar	***
Dissolved zinc	mg/L	17	67					0.0120	nonpar	0.99
Nitrate nitrogen	mg-N/L	14	67					0.2100	nonpar	0.99
Nitrite nitrogen	mg-N/L	30	61					0.6000	nonpar	0.99
pH	std units	67	67					6.02- 10.02	nonpar	0.99
Sulfate	mg/L	67	67					66.0500	nonpar	0.99
Total dissolved solids	mg/L	68	68					480.0000	nonpar	0.99
Total organic carbon	mg/L	64	68					63.0000	nonpar	0.99

Conf = confidence level for passing initial test or one of two verification resamples at all downgradient wells for a single constituent (nonparametric test only).

* - Insufficient Data.

** - Calculated limit raised to Manual Reporting Limit.

*** - Nonparametric limit based on ND value.

For transformed data, mean and SD in transformed units and prediction limit in original units.

All sample sizes and statistics are based on outlier free data.

For nonparametric limits, median reporting limits are substituted for extreme reporting limit values.

Groundwater Analytical Summary - Deep Wells: Third Quarter 2019
Cathcart Landfill, Snohomish County, WA

	Statistical Method	Number of Samples	Number of Detects	Prediction Limit	Primary GW Stds 173-200	G-09D					G-10D				
						7/30/19	D	V	Tr	Ch	7/30/19	D	V	Tr	Ch
						CONVENTIONAL CHEMISTRY PARAMETERS (mg/L)									
Alkalinity (as CaCO3)	nonpar	66	66	280	--	190					520		V		
Ammonia Nitrogen	nonpar	59	59	0.57	--	0.088					0.317				
Bicarbonate	nonpar	66	66	280	--	180					520		V		
Calcium, Dissolved	nonpar	63	63	6.32	--	1.37			D	N	22.0		V	D	N
Chemical Oxygen Demand	nonpar	66	16	160	--	12					10	U			
Chloride	lognor	66	65	9.3634	250	43.0			E		23.0		V	D	N
Conductivity (umhos/cm)	nonpar	66	66	510	700	700			V		1600		V		
Magnesium, Dissolved	nonpar	62	40	2.33	--	0.2	U				1.89		E	D	N
Nitrate Nitrogen (mg-N/L)	nonpar	65	14	0.21	10	0.13					0.01	U			
Nitrite Nitrogen (mg-N/L)	nonpar	59	29	0.6	1	0.011					0.002				
pH (std units)	nonpar	65	65	6.02-10.02	6.5-8.5	9.29					7.82				
Potassium, Dissolved	nonpar	66	62	1.6	--	0.48					1.67		V		
Sodium, Dissolved	nonpar	63	63	125.7068	20	156			V		324		V	D	N
Sulfate	nonpar	65	65	66.05	250	131			V		270		V		
Total Dissolved Solids	nonpar	66	66	480	500	470					970		V		
Total Organic Carbon	nonpar	66	62	63	--	3.5					4.4				D
DISSOLVED METALS EPA Methods 200.7/200.8 (mg/L)															
Antimony	nonpar	66	11	0.01	0.006	0.0003	U				0.0003	U			
Arsenic	lognor	62	45	0.0021	0.00005	0.00499					0.00117				
Barium	nonpar	63	13	0.0049	1	0.0005	U				0.0005	U			
Beryllium	nonpar	66	0	0.0005	0.004	0.0005	U				0.0005	U			
Cadmium	nonpar	58	9	0.0001	0.005	0.00005	U				0.00005	U			
Chromium	nonpar	66	8	0.0106	0.05	0.005	U				0.005	U			
Cobalt	nonpar	66	4	0.008	--	0.005	U				0.005	U			
Copper	nonpar	63	10	0.008	1	0.005	U	P			0.005	U			
Iron	lognor	60	30	0.1076	0.3	0.061					0.590				
Lead	nonpar	66	20	0.0023	0.05	0.000843			D	N	0.0001	U			
Manganese	lognor	57	43	0.0183	0.05	0.0121					0.3581			D	N
Nickel	nonpar	65	2	0.026	0.1	0.007			V		0.009		E		
Selenium	nonpar	65	16	0.004	0.01	0.0003	U				0.0003	U			
Silver	nonpar	62	6	0.0007	0.05	0.0001	U				0.0001	U			
Thallium	nonpar	65	7	0.001	0.002	0.00005	U				0.00005	U			
Vanadium	nonpar	66	0	0.008	--	0.01	U				0.01	U			
Zinc	nonpar	65	17	0.008	5	0.005					0.005	U			
TOTAL METALS EPA Methods 200.7/200.8 (mg/L)															
Antimony					0.006	0.0003	U				0.0003	U			
Arsenic					0.00005	0.00383					0.00132				
Barium					1	0.0105					0.005	U			
Beryllium					0.004	0.0005	U				0.0005	U			
Cadmium					0.005	0.00005	U				0.00005	U			
Chromium					0.05	0.0122					0.005	U			
Cobalt					--	0.005	U				0.005	U			
Copper					1	0.012					0.005	U			
Iron					0.3	1.76					0.691				
Lead					0.05	0.00275					0.0001	U			
Manganese					0.05	0.122					0.398				
Nickel					0.1	0.014					0.010				
Selenium					0.01	0.0003	U				0.0003	U			
Silver					0.05	0.0001	U				0.0001	U			
Thallium					0.002	0.00005	U				0.00005	U			
Vanadium					--	0.01	U				0.01	U			
Zinc					5	0.0091					0.005	U			
VOLATILE ORGANIC COMPOUNDS (VOCs) EPA Method 8260 (µg/L)															
1,1,1-Trichloroethane					200	1	U				1	U			
1,1,2,2-Tetrachloroethane					--	1	U				1	U			
1,1,2-Trichloroethane					--	1	U				1	U			
1,1-Dichloroethane					1	1	U				1	U			

**Groundwater Analytical Summary - Deep Wells: Third Quarter 2019
Cathcart Landfill, Snohomish County, WA**

	Statistical Method	Number of Samples	Number of Detects	Prediction Limit	Primary GW Stds 173-200	G-09D					G-10D				
						7/30/19	D	V	Tr	Ch	7/30/19	D	V	Tr	Ch
						VOLATILE ORGANIC COMPOUNDS (VOCs) EPA Method 8260 (µg/L) (cont.)									
1,1-Dichloroethylene					--	1	U				1	U			
1,2,3-Trichloropropane					--	1	U				1	U			
1,2-Dibromo-3-chloropropane					0.2	0.01	U				0.01	U			
1,2-Dibromoethane					0.001	0.01	U				0.01	U			
1,2-Dichlorobenzene					--	1	U				1	U			
1,2-Dichloroethane					0.5	0.5	U				0.5	U			
1,2-Dichloropropane					0.6	0.6	U				0.6	U			
1,4-Dichlorobenzene					4	1	U				1	U			
2-Butanone					--	5	U				5	U			
2-Hexanone					--	5	U				5	U			
4-Methyl-2-Pentanone (MIBK)					--	5	U				5	U			
Acetone					--	5	U				5	U			
Acrylonitrile					0.07	0.01	U				0.01	U			
Benzene					1	1	U				1	U			
Bromodichloromethane					0.3	0.3	U				0.3	U			
Bromoform					5	1	U				1	U			
Bromomethane					--	1	U				1	U			
Carbon Disulfide					--	1	U				1	U			
Carbon Tetrachloride					0.3	0.3	U				0.3	U			
Chlorobenzene					--	0.2	U				0.2	U			
Chlorodibromomethane					0.5	0.5	U				0.5	U			
Chloroethane					--	1	U				1	U			
Chloroform					7	1	U				1	U			
Chloromethane					--	1	U				1	U			
cis-1,2-Dichloroethene					--	0.2	U				0.2	U			
cis-1,3-Dichloropropene					0.2	0.2	U				0.2	U			
Dibromomethane					--	0.01	U				0.01	U			
Ethyl Benzene					--	1	U				1	U			
m,p-Xylene					--	1	U				1	U			
Methyl Iodide					--	1	U				1	U			
Methylene Chloride					5	2	U				2	U			
o-Xylene					--	1	U				1	U			
Styrene					--	1	U				1	U			
Tetrachloroethylene					0.8	0.8	U				0.8	U			
Toluene					--	1	U				1	U			
trans-1,2-Dichloroethene					--	1	U				1	U			
trans-1,3-Dichloropropene					0.2	0.2	U				0.2	U			
trans-1,4-Dichloro-2-butene					--	5	U				5	U			
Trichlorethene (1,1,2-Trichloroethylene)					3	1	U				1	U			
Trichlorofluoromethane					--	1	U				1	U			
Vinyl Acetate					--	5	U				5	U			
Vinyl Chloride					0.02	0.01	U				0.01	U			

D: U = Indicates compound was not detected at the given reporting limit; X indicates that the compound was detected in the trip blank and contamination is suspected.
V: E= Exceedance, waiting verification based on subsequent lab data; V= Exceedance verified based on previous lab data; P=Passed, previous exceedance not verified based on current lab data.
Tr: I=increasing Trend, D=Decreasing Trend;
Ch: Y indicates a change in trend from previous quarter; N means no change in trend.
Values in purple exceed the prediction limit; indicates that a value exceeded the Groundwater Standards
The groundwater standards listed are based on the Washington Administrative Code (WAC) 173-200 groundwater limits as modified by the TMS 91-11 standards.
X = Methylene chloride was measured in the trip blank, but not in the lab blank - contaminations during transport is suspected.

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result	Pred. Limit
Alkalinity (as cacO ₃)	mg/L	G-01D	04/24/2019		230.0000	280.0000
Ammonia nitrogen	mg-N/L	G-01D	04/24/2019		0.1420	0.5700
Bicarbonate	mg/L	G-01D	04/24/2019		200.0000	280.0000
Chemical oxygen demand	mg/L	G-01D	04/24/2019	ND	10.0000	160.0000
Chloride	mg/L	G-01D	04/24/2019		6.7200	9.3634
Conductivity	umhos/cm	G-01D	04/24/2019		590.0000	510.0000
Dissolved antimony	mg/L	G-01D	04/24/2019	ND	0.0003	0.0100
Dissolved arsenic	mg/L	G-01D	04/24/2019		0.0003	25.2225
Dissolved barium	mg/L	G-01D	04/24/2019		0.0021	0.0037
Dissolved beryllium	mg/L	G-01D	04/24/2019	ND	0.0005	0.0005
Dissolved cadmium	mg/L	G-01D	04/24/2019	ND	0.0001	0.0001
Dissolved calcium	mg/L	G-01D	04/24/2019		1.4700	6.3200
Dissolved chromium	mg/L	G-01D	04/24/2019	ND	0.0050	0.0136
Dissolved cobalt	mg/L	G-01D	04/24/2019	ND	0.0050	0.0040
Dissolved copper	mg/L	G-01D	04/24/2019	ND	0.0050	0.0080
Dissolved iron	mg/L	G-01D	04/24/2019		0.2250	21.8371
Dissolved lead	mg/L	G-01D	04/24/2019		0.0002	0.0023
Dissolved magnesium	mg/L	G-01D	04/24/2019	ND	0.2000	2.3300
Dissolved manganese	mg/L	G-01D	04/24/2019		0.0059	6.8059
Dissolved nickel	mg/L	G-01D	04/24/2019	ND	0.0050	0.0060
Dissolved potassium	mg/L	G-01D	04/24/2019		0.2600	1.6000
Dissolved selenium	mg/L	G-01D	04/24/2019	ND	0.0003	0.0025
Dissolved silver	mg/L	G-01D	04/24/2019	ND	0.0001	0.0007
Dissolved sodium	mg/L	G-01D	04/24/2019		156.0000	125.7068
Dissolved thallium	mg/L	G-01D	04/24/2019	ND	0.0001	0.0030
Dissolved thallium	mg/L	G-01D	04/24/2019	ND	0.0100	0.0050
Dissolved zinc	mg/L	G-01D	04/24/2019	ND	0.0050	0.0120
Nitrate nitrogen	mg-N/L	G-01D	04/24/2019	ND	0.0100	0.2100
Nitrite nitrogen	mg-N/L	G-01D	04/24/2019		0.0160	0.6000
pH	std units	G-01D	04/24/2019		9.1800	6.02 - 10.02
Sulfate	mg/L	G-01D	04/24/2019		52.3000	66.0500
Total dissolved solids	mg/L	G-01D	04/24/2019		420.0000	480.0000
Total organic carbon	mg/L	G-01D	04/24/2019		26.0000	63.0000
Alkalinity (as cacO ₃)	mg/L	G-02D	04/23/2019		82.0000	280.0000
Ammonia nitrogen	mg-N/L	G-02D	04/23/2019	ND	0.0200	0.5700
Bicarbonate	mg/L	G-02D	04/23/2019		82.0000	280.0000
Chemical oxygen demand	mg/L	G-02D	04/23/2019	ND	10.0000	160.0000
Chloride	mg/L	G-02D	04/23/2019		5.8000	9.3634
Conductivity	umhos/cm	G-02D	04/23/2019		350.0000	510.0000
Dissolved antimony	mg/L	G-02D	04/23/2019	ND	0.0003	0.0100
Dissolved arsenic	mg/L	G-02D	04/23/2019		0.0028	25.2225
Dissolved barium	mg/L	G-02D	04/23/2019		0.0016	0.0037
Dissolved beryllium	mg/L	G-02D	04/23/2019	ND	0.0005	0.0005
Dissolved cadmium	mg/L	G-02D	04/23/2019	ND	0.0001	0.0001
Dissolved calcium	mg/L	G-02D	04/23/2019		0.4700	6.3200
Dissolved chromium	mg/L	G-02D	04/23/2019	ND	0.0050	0.0136
Dissolved cobalt	mg/L	G-02D	04/23/2019	ND	0.0050	0.0040
Dissolved copper	mg/L	G-02D	04/23/2019		0.0130	0.0080
Dissolved iron	mg/L	G-02D	04/23/2019		0.2200	21.8371
Dissolved lead	mg/L	G-02D	04/23/2019		0.0002	0.0023
Dissolved magnesium	mg/L	G-02D	04/23/2019	ND	0.2000	2.3300
Dissolved manganese	mg/L	G-02D	04/23/2019		0.0053	6.8059
Dissolved nickel	mg/L	G-02D	04/23/2019		0.0090	0.0060
Dissolved potassium	mg/L	G-02D	04/23/2019		0.2400	1.6000
Dissolved selenium	mg/L	G-02D	04/23/2019	ND	0.0003	0.0025
Dissolved silver	mg/L	G-02D	04/23/2019	ND	0.0001	0.0007
Dissolved sodium	mg/L	G-02D	04/23/2019		84.4000	125.7068
Dissolved thallium	mg/L	G-02D	04/23/2019	ND	0.0001	0.0030
Dissolved vanadium	mg/L	G-02D	04/23/2019	ND	0.0100	0.0050
Dissolved zinc	mg/L	G-02D	04/23/2019	ND	0.0050	0.0120
Nitrate nitrogen	mg-N/L	G-02D	04/23/2019		0.6800	0.2100
Nitrite nitrogen	mg-N/L	G-02D	04/23/2019		0.0030	0.6000
pH	std units	G-02D	04/23/2019		7.5300	6.02 - 10.02
Sulfate	mg/L	G-02D	04/23/2019		77.3000	66.0500
Total dissolved solids	mg/L	G-02D	04/23/2019		240.0000	480.0000
Total organic carbon	mg/L	G-02D	04/23/2019		3.9000	63.0000
Alkalinity (as cacO ₃)	mg/L	G-06B	04/24/2019		210.0000	280.0000

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result		Pred. Limit
Ammonia nitrogen	mg-N/L	G-06B	04/24/2019		0.1520		0.5700
Bicarbonate	mg/L	G-06B	04/24/2019		210.0000		280.0000
Chemical oxygen demand	mg/L	G-06B	04/24/2019		12.0000		160.0000
Chloride	mg/L	G-06B	04/24/2019		8.3500		9.3634
Conductivity	umhos/cm	G-06B	04/24/2019		400.0000	**	510.0000
Dissolved antimony	mg/L	G-06B	04/24/2019	ND	0.0003		0.0100
Dissolved arsenic	mg/L	G-06B	04/24/2019		0.0162		25.2225
Dissolved barium	mg/L	G-06B	04/24/2019		0.0035		0.0037
Dissolved beryllium	mg/L	G-06B	04/24/2019	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-06B	04/24/2019		0.0001		0.0001
Dissolved calcium	mg/L	G-06B	04/24/2019		29.6000	*	6.3200
Dissolved chromium	mg/L	G-06B	04/24/2019		0.0055		0.0136
Dissolved cobalt	mg/L	G-06B	04/24/2019		0.0120	*	0.0040
Dissolved copper	mg/L	G-06B	04/24/2019	ND	0.0050		0.0080
Dissolved iron	mg/L	G-06B	04/24/2019		14.7000		21.8371
Dissolved lead	mg/L	G-06B	04/24/2019	ND	0.0001		0.0023
Dissolved magnesium	mg/L	G-06B	04/24/2019		18.2000	*	2.3300
Dissolved manganese	mg/L	G-06B	04/24/2019		4.1800		6.8059
Dissolved nickel	mg/L	G-06B	04/24/2019		0.0140	*	0.0060
Dissolved potassium	mg/L	G-06B	04/24/2019		1.5700		1.6000
Dissolved selenium	mg/L	G-06B	04/24/2019		0.0004		0.0025
Dissolved silver	mg/L	G-06B	04/24/2019	ND	0.0001		0.0007
Dissolved sodium	mg/L	G-06B	04/24/2019		10.8000	**	125.7068
Dissolved thallium	mg/L	G-06B	04/24/2019	ND	0.0001		0.0030
Dissolved vanadium	mg/L	G-06B	04/24/2019	ND	0.0100		0.0050
Dissolved zinc	mg/L	G-06B	04/24/2019		0.0070		0.0120
Nitrate nitrogen	mg-N/L	G-06B	04/24/2019	ND	0.0100	**	0.2100
Nitrite nitrogen	mg-N/L	G-06B	04/24/2019		0.0080		0.6000
pH	std units	G-06B	04/24/2019		7.8700		6.02 - 10.02
Sulfate	mg/L	G-06B	04/24/2019		25.0000	**	66.0500
Total dissolved solids	mg/L	G-06B	04/24/2019		270.0000		480.0000
Total organic carbon	mg/L	G-06B	04/24/2019		29.0000		63.0000
Alkalinity (as cacO3)	mg/L	G-08D2	04/23/2019		180.0000		280.0000
Ammonia nitrogen	mg-N/L	G-08D2	04/23/2019		0.1590		0.5700
Bicarbonate	mg/L	G-08D2	04/23/2019		150.0000		280.0000
Chemical oxygen demand	mg/L	G-08D2	04/23/2019	ND	10.0000		160.0000
Chloride	mg/L	G-08D2	04/23/2019		2.9200		9.3634
Conductivity	umhos/cm	G-08D2	04/23/2019		430.0000		510.0000
Dissolved antimony	mg/L	G-08D2	04/23/2019	ND	0.0003		0.0100
Dissolved arsenic	mg/L	G-08D2	04/23/2019		0.0016		25.2225
Dissolved barium	mg/L	G-08D2	04/23/2019		0.0046	*	0.0037
Dissolved beryllium	mg/L	G-08D2	04/23/2019	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-08D2	04/23/2019	ND	0.0001		0.0001
Dissolved calcium	mg/L	G-08D2	04/23/2019		1.1800		6.3200
Dissolved chromium	mg/L	G-08D2	04/23/2019	ND	0.0050		0.0136
Dissolved cobalt	mg/L	G-08D2	04/23/2019	ND	0.0050		0.0040
Dissolved copper	mg/L	G-08D2	04/23/2019	ND	0.0050		0.0080
Dissolved iron	mg/L	G-08D2	04/23/2019		1.3000		21.8371
Dissolved lead	mg/L	G-08D2	04/23/2019		0.0003		0.0023
Dissolved magnesium	mg/L	G-08D2	04/23/2019		0.4000		2.3300
Dissolved manganese	mg/L	G-08D2	04/23/2019		0.0366		6.8059
Dissolved nickel	mg/L	G-08D2	04/23/2019	ND	0.0050		0.0060
Dissolved potassium	mg/L	G-08D2	04/23/2019		0.3500		1.6000
Dissolved selenium	mg/L	G-08D2	04/23/2019	ND	0.0003		0.0025
Dissolved silver	mg/L	G-08D2	04/23/2019	ND	0.0001		0.0007
Dissolved sodium	mg/L	G-08D2	04/23/2019		109.0000		125.7068
Dissolved thallium	mg/L	G-08D2	04/23/2019	ND	0.0001		0.0030
Dissolved vanadium	mg/L	G-08D2	04/23/2019	ND	0.0100		0.0050
Dissolved zinc	mg/L	G-08D2	04/23/2019		0.0070		0.0120
Nitrate nitrogen	mg-N/L	G-08D2	04/23/2019		0.0170		0.2100
Nitrite nitrogen	mg-N/L	G-08D2	04/23/2019		0.0060		0.6000
pH	std units	G-08D2	04/23/2019		9.9000		6.02 - 10.02
Sulfate	mg/L	G-08D2	04/23/2019		41.0000		66.0500
Total dissolved solids	mg/L	G-08D2	04/23/2019		290.0000		480.0000
Total organic carbon	mg/L	G-08D2	04/23/2019		4.2000		63.0000
Alkalinity (as cacO3)	mg/L	G-09D	07/30/2019		195.0000		280.0000
Ammonia nitrogen	mg-N/L	G-09D	07/30/2019		0.0860		0.5700

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result		Pred. Limit
Bicarbonate	mg/L	G-09D	07/30/2019		185.0000		280.0000
Chemical oxygen demand	mg/L	G-09D	07/30/2019		13.5000		160.0000
Chloride	mg/L	G-09D	07/30/2019		42.6500	*	9.3634
Conductivity	umhos/cm	G-09D	07/30/2019		700.0000	***	510.0000
Dissolved antimony	mg/L	G-09D	07/30/2019	ND	0.0003		0.0100
Dissolved arsenic	mg/L	G-09D	07/30/2019		0.0046		25.2225
Dissolved barium	mg/L	G-09D	07/30/2019	ND	0.0005		0.0037
Dissolved beryllium	mg/L	G-09D	07/30/2019	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-09D	07/30/2019	ND	0.0001		0.0001
Dissolved calcium	mg/L	G-09D	07/30/2019		1.3750		6.3200
Dissolved chromium	mg/L	G-09D	07/30/2019	ND	0.0050		0.0136
Dissolved cobalt	mg/L	G-09D	07/30/2019	ND	0.0050		0.0040
Dissolved copper	mg/L	G-09D	07/30/2019	ND	0.0050	**	0.0080
Dissolved iron	mg/L	G-09D	07/30/2019		0.0775		21.8371
Dissolved lead	mg/L	G-09D	07/30/2019		0.0008		0.0023
Dissolved magnesium	mg/L	G-09D	07/30/2019	ND	0.2000		2.3300
Dissolved manganese	mg/L	G-09D	07/30/2019		0.0148		6.8059
Dissolved nickel	mg/L	G-09D	07/30/2019		0.0065	***	0.0060
Dissolved potassium	mg/L	G-09D	07/30/2019		0.4900		1.6000
Dissolved selenium	mg/L	G-09D	07/30/2019	ND	0.0003		0.0025
Dissolved silver	mg/L	G-09D	07/30/2019	ND	0.0001		0.0007
Dissolved sodium	mg/L	G-09D	07/30/2019		157.0000	***	125.7068
Dissolved thallium	mg/L	G-09D	07/30/2019	ND	0.0001		0.0030
Dissolved vanadium	mg/L	G-09D	07/30/2019	ND	0.0100		0.0050
Dissolved zinc	mg/L	G-09D	07/30/2019		0.0050		0.0120
Nitrate nitrogen	mg-N/L	G-09D	07/30/2019		0.1300		0.2100
Nitrite nitrogen	mg-N/L	G-09D	07/30/2019		0.0115		0.6000
pH	std units	G-09D	07/30/2019		9.2900		6.02 - 10.02
Sulfate	mg/L	G-09D	07/30/2019		135.5000	***	66.0500
Total dissolved solids	mg/L	G-09D	07/30/2019		465.0000		480.0000
Total organic carbon	mg/L	G-09D	07/30/2019		3.5000		63.0000
Alkalinity (as cacO3)	mg/L	G-10D	07/30/2019		520.0000	***	280.0000
Ammonia nitrogen	mg-N/L	G-10D	07/30/2019		0.3170		0.5700
Bicarbonate	mg/L	G-10D	07/30/2019		520.0000	***	280.0000
Chemical oxygen demand	mg/L	G-10D	07/30/2019	ND	10.0000		160.0000
Chloride	mg/L	G-10D	07/30/2019		23.0000	***	9.3634
Conductivity	umhos/cm	G-10D	07/30/2019		1600.0000	***	510.0000
Dissolved antimony	mg/L	G-10D	07/30/2019	ND	0.0003		0.0100
Dissolved arsenic	mg/L	G-10D	07/30/2019		0.0012		25.2225
Dissolved barium	mg/L	G-10D	07/30/2019	ND	0.0005		0.0037
Dissolved beryllium	mg/L	G-10D	07/30/2019	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-10D	07/30/2019	ND	0.0001		0.0001
Dissolved calcium	mg/L	G-10D	07/30/2019		22.0000	***	6.3200
Dissolved chromium	mg/L	G-10D	07/30/2019	ND	0.0050		0.0136
Dissolved cobalt	mg/L	G-10D	07/30/2019	ND	0.0050		0.0040
Dissolved copper	mg/L	G-10D	07/30/2019	ND	0.0050		0.0080
Dissolved iron	mg/L	G-10D	07/30/2019		0.5900		21.8371
Dissolved lead	mg/L	G-10D	07/30/2019	ND	0.0001		0.0023
Dissolved magnesium	mg/L	G-10D	07/30/2019		1.8900		2.3300
Dissolved manganese	mg/L	G-10D	07/30/2019		0.3581		6.8059
Dissolved nickel	mg/L	G-10D	07/30/2019		0.0090	*	0.0060
Dissolved potassium	mg/L	G-10D	07/30/2019		1.6700	***	1.6000
Dissolved selenium	mg/L	G-10D	07/30/2019	ND	0.0003		0.0025
Dissolved silver	mg/L	G-10D	07/30/2019	ND	0.0001		0.0007
Dissolved sodium	mg/L	G-10D	07/30/2019		324.0000	***	125.7068
Dissolved thallium	mg/L	G-10D	07/30/2019	ND	0.0001		0.0030
Dissolved vanadium	mg/L	G-10D	07/30/2019	ND	0.0100		0.0050
Dissolved zinc	mg/L	G-10D	07/30/2019	ND	0.0050		0.0120
Nitrate nitrogen	mg-N/L	G-10D	07/30/2019	ND	0.0100		0.2100
Nitrite nitrogen	mg-N/L	G-10D	07/30/2019		0.0020		0.6000
pH	std units	G-10D	07/30/2019		7.8200		6.02 - 10.02
Sulfate	mg/L	G-10D	07/30/2019		270.0000	***	66.0500
Total dissolved solids	mg/L	G-10D	07/30/2019		970.0000	***	480.0000
Total organic carbon	mg/L	G-10D	07/30/2019		4.4000		63.0000
Alkalinity (as cacO3)	mg/L	G-13D	04/24/2019		170.0000		280.0000
Ammonia nitrogen	mg-N/L	G-13D	04/24/2019		0.0820		0.5700
Bicarbonate	mg/L	G-13D	04/24/2019		130.0000		280.0000

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result	Pred. Limit
Chemical oxygen demand	mg/L	G-13D	04/24/2019	ND	10.0000	160.0000
Chloride	mg/L	G-13D	04/24/2019		8.7900	9.3634
Conductivity	umhos/cm	G-13D	04/24/2019		420.0000	510.0000
Dissolved antimony	mg/L	G-13D	04/24/2019	ND	0.0003	0.0100
Dissolved arsenic	mg/L	G-13D	04/24/2019		0.0002	25.2225
Dissolved barium	mg/L	G-13D	04/24/2019	ND	0.0005	0.0037
Dissolved beryllium	mg/L	G-13D	04/24/2019	ND	0.0005	0.0005
Dissolved cadmium	mg/L	G-13D	04/24/2019	ND	0.0001	0.0001
Dissolved calcium	mg/L	G-13D	04/24/2019		0.5300	6.3200
Dissolved chromium	mg/L	G-13D	04/24/2019	ND	0.0050	0.0136
Dissolved cobalt	mg/L	G-13D	04/24/2019	ND	0.0050	0.0040
Dissolved copper	mg/L	G-13D	04/24/2019	ND	0.0050	0.0080
Dissolved iron	mg/L	G-13D	04/24/2019	ND	0.0100	21.8371
Dissolved lead	mg/L	G-13D	04/24/2019	ND	0.0001	0.0023
Dissolved magnesium	mg/L	G-13D	04/24/2019	ND	0.2000	2.3300
Dissolved manganese	mg/L	G-13D	04/24/2019	ND	0.0050	6.8059
Dissolved nickel	mg/L	G-13D	04/24/2019	ND	0.0050	0.0060
Dissolved potassium	mg/L	G-13D	04/24/2019	ND	0.2000	1.6000
Dissolved selenium	mg/L	G-13D	04/24/2019	ND	0.0003	0.0025
Dissolved silver	mg/L	G-13D	04/24/2019	ND	0.0001	0.0007
Dissolved sodium	mg/L	G-13D	04/24/2019		99.6000	125.7068
Dissolved thallium	mg/L	G-13D	04/24/2019	ND	0.0001	0.0030
Dissolved vanadium	mg/L	G-13D	04/24/2019	ND	0.0100	0.0050
Dissolved zinc	mg/L	G-13D	04/24/2019	ND	0.0050	0.0120
Nitrate nitrogen	mg-N/L	G-13D	04/24/2019	ND	0.0100	0.2100
Nitrite nitrogen	mg-N/L	G-13D	04/24/2019		0.0030	0.6000
pH	std units	G-13D	04/24/2019		9.3000	6.02 - 10.02
Sulfate	mg/L	G-13D	04/24/2019		36.8000	66.0500
Total dissolved solids	mg/L	G-13D	04/24/2019		300.0000	480.0000
Total organic carbon	mg/L	G-13D	04/24/2019		3.0000	63.0000

* - Current value failed - awaiting verification.

** - Current value passed - previous exceedance not verified.

*** - Current value failed - exceedance verified.

**** - Current value passed - awaiting one more verification.

***** - Insufficient background data to compute prediction limit.

ND = Not Detected, Result = detection limit.

Table 5

Summary Statistics and Prediction Limits

Constituent	Units	Detect	N	Mean	SD	alpha	Factor	Pred Limit	Type	Conf
Alkalinity (as caco3)	mg/L	68	68					280.0000	nonpar	0.99
Ammonia nitrogen	mg-N/L	61	61					0.5700	nonpar	0.99
Bicarbonate	mg/L	68	68					280.0000	nonpar	0.99
Chemical oxygen demand	mg/L	16	68					160.0000	nonpar	0.99
Chloride	mg/L	67	68	1.3018	0.3895	0.0100	2.4007	9.3634	lognor	
Conductivity	umhos/cm	68	68					510.0000	nonpar	0.99
Dissolved antimony	mg/L	11	68					0.0100	nonpar	0.99
Dissolved arsenic	mg/L	47	64	-6.0635	3.8624	0.0100	2.4056	25.2225	lognor	
Dissolved barium	mg/L	14	65					0.0037	nonpar	0.99
Dissolved beryllium	mg/L	0	68					0.0005	nonpar	***
Dissolved cadmium	mg/L	9	60					0.0001	nonpar	0.99
Dissolved calcium	mg/L	65	65					6.3200	nonpar	0.99
Dissolved chromium	mg/L	8	68					0.0136	nonpar	0.99
Dissolved cobalt	mg/L	4	68					0.0040	nonpar	0.99
Dissolved copper	mg/L	10	65					0.0080	nonpar	0.99
Dissolved iron	mg/L	31	62	-1.7121	1.9914	0.0100	2.4082	21.8371	lognor	
Dissolved lead	mg/L	21	68					0.0023	nonpar	0.99
Dissolved magnesium	mg/L	42	65					2.3300	nonpar	0.99
Dissolved manganese	mg/L	44	59	-4.1840	2.5292	0.0100	2.4125	6.8059	lognor	
Dissolved nickel	mg/L	2	67					0.0060	nonpar	0.99
Dissolved potassium	mg/L	62	68					1.6000	nonpar	0.99
Dissolved selenium	mg/L	16	67					0.0025	nonpar	0.99
Dissolved silver	mg/L	6	64					0.0007	nonpar	0.99
Dissolved sodium	mg/L	65	65	107.8431	7.4299	0.0100	2.4043	125.7068	normal	
Dissolved thallium	mg/L	7	67					0.0030	nonpar	0.99
Dissolved vanadium	mg/L	0	68					0.0050	nonpar	***
Dissolved zinc	mg/L	17	67					0.0120	nonpar	0.99
Nitrate nitrogen	mg-N/L	14	67					0.2100	nonpar	0.99
Nitrite nitrogen	mg-N/L	30	61					0.6000	nonpar	0.99
pH	std units	67	67					6.02- 10.02	nonpar	0.99
Sulfate	mg/L	67	67					66.0500	nonpar	0.99
Total dissolved solids	mg/L	68	68					480.0000	nonpar	0.99
Total organic carbon	mg/L	64	68					63.0000	nonpar	0.99

Conf = confidence level for passing initial test or one of two verification resamples at all downgradient wells for a single constituent (nonparametric test only).

* - Insufficient Data.

** - Calculated limit raised to Manual Reporting Limit.

*** - Nonparametric limit based on ND value.

For transformed data, mean and SD in transformed units and prediction limit in original units.

All sample sizes and statistics are based on outlier free data.

For nonparametric limits, median reporting limits are substituted for extreme reporting limit values.

Groundwater Analytical Summary - Deep Wells: Second Quarter 2019
Cathcart Landfill, Snohomish County, WA

Parameter	Statistical Method	Number of Samples	Number of Detects	Prediction Limit	Primary GW Stds 173-200	Downgradient Wells																								Upgradient Wells																					
						G-01D				G-02D				G-06B				G-08D2				G-09D				G-10D				G-13D				G-14D				G-24D													
						10/23/19	D	V	Tr	Ch	10/22/19	D	V	Tr	Ch	10/22/19	D	V	Tr	Ch	10/22/19	D	V	Tr	Ch	10/23/19	D	V	Tr	Ch	10/23/19	D	V	Tr	Ch	10/22/19	D	V	Tr	Ch	10/22/19	D	V	Tr	Ch	10/23/19	D	V	Tr	Ch	
CONVENTIONAL CHEMISTRY PARAMETERS (mg/L)																																																			
Alkalinity (as CaCO3)	nonpar	68	68	280	--	250					110					240					210					120					480	V				170					260					230					
Ammonia Nitrogen	nonpar	61	61	0.57	--	0.146					0.057					0.069					0.186					0.155					0.360					0.056				D	N	0.158			D	N	0.113				
Bicarbonate	nonpar	68	68	280	--	210					100					210					140					100					480	V				130					160					230					
Calcium, Dissolved	nonpar	65	65	6.32	--	1.02					0.51					1.05					1.26					1.70					21.3	V	D	N		0.50					0.92				I	Y	0.63				
Chemical Oxygen Demand	nonpar	68	16	160	--	10	U				10	U				10	U				12					26					26					12					10	U				12					
Chloride	lognor	68	67	9.3634	250	6.00					4.83					6.98					2.86					19.3					17.9	V	D	N		9.57				E		1.87				3.62				D	N
Conductivity (umhos/cm)	nonpar	68	68	510	700	600					390					690					460					830					1600	V				450					480					500					
Magnesium, Dissolved	nonpar	65	42	2.33	--	0.2	U				0.2	U				0.2	U				0.22					0.2	U				1.76					0.2	U				0.32					0.2	U				
Nitrate Nitrogen (mg-N/L)	nonpar	67	14	0.21	10	0.01	U				0.58					0.18					0.01	U				0.058					0.01	U				0.01	U				0.01	U				0.01	U				
Nitrite Nitrogen (mg-N/L)	nonpar	61	30	0.6	1	0.002	U				0.002	U				0.003					0.002	U				0.004					0.002	U				0.007					0.007					0.002	U				
pH (std units)	nonpar	67	67	6.02-10.02	6.5-8.5	9.29					7.61					7.95					9.93					8.12					6.76					9.37					9.74					8.61				I	N
Potassium, Dissolved	nonpar	68	62	1.6	--	0.39					0.39					0.37					0.28					0.47					1.51					0.24					0.24					0.2					
Sodium, Dissolved	normal	65	65	125.7068	20	153					87.9					177					110					189					363	V				102					122					127					
Sulfate	nonpar	67	67	66.05	250	43.2					73.7					77.2					46.2					160					293	V				37.1					2.47					30.1					
Total Dissolved Solids	nonpar	68	68	480	500	350					220					440					350					450					1000	V				290					260					220					
Total Organic Carbon	nonpar	68	64	63	--	2.3					0.88					2.9					2.6					4.6					4.0					1.4					21.0					2.4					
DISSOLVED METALS EPA Methods 200.7/200.8 (mg/L)																																																			
Antimony	nonpar	68	11	0.01	0.006	0.0003	U				0.0003	U				0.0003	U				0.0003	U				0.0003	U				0.0003	U				0.0003	U				0.0003	U				0.0003	U				
Arsenic	lognor	64	47	0.0021	0.00005	0.000641					0.00365					0.00398					0.000811					0.00278					0.00123					0.0001					0.000839					0.00005	U				
Barium	nonpar	65	14	0.0049	1	0.0009					0.0011					0.0009					0.0029					0.0005					0.0025					0.0005	U				0.003					0.001					
Beryllium	nonpar	68	0	0.0005	0.004	0.0005	U				0.0005	U				0.0005	U				0.0005	U				0.0005	U				0.0005	U				0.0005	U				0.0005	U				0.0005	U				
Cadmium	nonpar	60	9	0.0001	0.005	0.00005	U				0.00005	U				0.00005	U				0.00005	U				0.00005	U				0.00005	U				0.00005	U				0.00005	U				0.00005	U				
Chromium	nonpar	68	8	0.0106	0.05	0.005	U				0.005	U				0.005	U				0.005	U				0.005	U				0.005	U				0.005	U				0.005	U				0.0099					
Cobalt	nonpar	68	4	0.008	--	0.005	U				0.005	U				0.005	U				0.005	U				0.005	U				0.005	U				0.005	U				0.005	U				0.005	U				
Copper	nonpar	65	10	0.008	1	0.005	U				0.009					0.005	U				0.005	U				0.005	U				0.005	U				0.005	U				0.005	U				0.005	U				
Iron	lognor	62	31	0.1076	0.3	0.082					0.115					0.04					0.082					0.054					0.054					0.013					0.013					0.018					
Lead	nonpar	68	21	0.0023	0.05	0.000175					0.491					0.000162					0.00027					0.000828					0.0001	U				0.0001	U				0.00027					0.0001	U				
Manganese	lognor	59	44	0.0183	0.05	0.005	U				0.005					0.005	U				0.034					0.025					0.343					0.005	U				0.015					0.005	U				
Nickel	nonpar	67	2	0.026	0.1	0.005	U				0.007					0.007					0.005	U				0.006					0.007					0.005	U				0.005	U				0.005	U				
Selenium	nonpar	67	16	0.004	0.01	0.0003	U				0.0003	U				0.0003	U				0.0003	U				0.0003	U				0.0003	U				0.0003	U				0.0003	U				0.0003	U				
Silver	nonpar	64	6	0.0007	0.05	0.0001	U				0.0001	U				0.0001	U				0.0001	U				0.0001	U				0.0001	U				0.0001	U				0.0001	U				0.0001	U				
Thallium	nonpar	67	7	0.001	0.002	0.00005	U				0.00005	U				0.00005	U				0.00005	U				0.00005	U				0.00005	U				0.00005	U				0.00005	U				0.00005	U				
Vanadium	nonpar	68	0	0.008	--	0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				
Zinc	nonpar	67	17	0.008	5	0.005	U				0.005	U				0.005	U				0.005	U				0.005	U				0.005	U				0.005	U				0.005	U				0.005	U				
TOTAL METALS EPA Methods 200.7/200.8 (mg/L)																																																			
Antimony					0.006	0.0003	U				0.0003	U				0.0003	U				0.0003	U				0.0003	U				0.0003	U				0.0003	U				0.0003	U				0.0003	U				
Arsenic					0.00005	0.000544					0.00429					0.00262					0.00163					0.00239					0.00132					0.000259					0.000958					0.00005	U				
Barium					1	0.0136					0.0082					0.0082					0.0559					0.0076					0.005	U				0.005	U				0.0322					0.005	U				
Beryllium					0.004	0.0005	U				0.0005	U				0.0005	U				0.0005	U				0.0005	U				0.0005	U				0.0005	U				0.0005	U				0.0005	U				
Cadmium					0.005	0.00005	U				0.00005	U				0.00005	U				0.00005	U				0.00005	U				0.00005	U				0.00005	U				0.00005	U				0.00005	U				
Chromium					0.05	0.0069					0.005	U				0.0182					0.0163					0.0067					0.005	U				0.005	U				0.013					0.005	U				

Groundwater Analytical Summary - Deep Wells: Second Quarter 2019
Cathcart Landfill, Snohomish County, WA

Statistical Method	Number of Samples	Number of Detects	Prediction Limit	Primary GW Stds 173-200	Downgradient Wells																								Upgradient Wells												
					G-01D				G-02D				G-06B				G-08D2				G-09D				G-10D				G-13D				G-14D				G-24D				
					10/23/19	D	V	Tr	Ch	10/22/19	D	V	Tr	Ch	10/22/19	D	V	Tr	Ch	10/22/19	D	V	Tr	Ch	10/23/19	D	V	Tr	Ch	10/23/19	D	V	Tr	Ch	10/22/19	D	V	Tr	Ch	10/23/19	D
VOLATILE ORGANIC COMPOUNDS (VOCs) EPA Method 8260 (µg/L) (cont.)																																									
1,1-Dichloroethylene				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U					
1,2,3-Trichloropropane				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U					
1,2-Dibromo-3-chloropropane				0.2	0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U					
1,2-Dibromoethane				0.001	0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U					
1,2-Dichlorobenzene				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U					
1,2-Dichloroethane				0.5	0.5	U				0.5	U				0.5	U				0.5	U				0.5	U				0.5	U				0.5	U					
1,2-Dichloropropane				0.6	0.6	U				0.6	U				0.6	U				0.6	U				0.6	U				0.6	U				0.6	U					
1,4-Dichlorobenzene				4	1	U				1	U				1	U				1	U				1	U				1	U				1	U					
2-Butanone				--	5	U				5	U				5	U				5	U				5	U				5	U				5	U					
2-Hexanone				--	5	U				5	U				5	U				5	U				5	U				5	U				5	U					
4-Methyl-2-Pentanone (MIBK)				--	5	U				5	U				5	U				5	U				5	U				5	U				5	U					
Acetone				--	5	U				5	U				5	U				5	U				5	U				5	U				5	U					
Acrylonitrile				0.07	0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U					
Benzene				1	1	U				1	U				1	U				1	U				1	U				1	U				1	U					
Bromodichloromethane				0.3	0.3	U				0.3	U				0.3	U				0.3	U				0.3	U				0.3	U				0.3	U					
Bromoform				5	1	U				1	U				1	U				1	U				1	U				1	U				1	U					
Bromomethane				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U					
Carbon Disulfide				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U					
Carbon Tetrachloride				0.3	0.3	U				0.3	U				0.3	U				0.3	U				0.3	U				0.3	U				0.3	U					
Chlorobenzene				--	0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U					
Chlorodibromomethane				0.5	0.5	U				0.5	U				0.5	U				0.5	U				0.5	U				0.5	U				0.5	U					
Chloroethane				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U					
Chloroform				7	1	U				1	U				1	U				1	U				1	U				1	U				1	U					
Chloromethane				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U					
cis-1,2-Dichloroethene				--	0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U					
cis-1,3-Dichloropropene				0.2	0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U					
Dibromomethane				--	0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U					
Ethyl Benzene				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U					
m,p-Xylene				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U					
Methyl Iodide				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U					
Methylene Chloride				5	2.0	U				2.0	U				2.0	U				2.0	U				2.0	U			2.0	U				2.0	U						
o-Xylene				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U					
Styrene				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U					
Tetrachloroethylene				0.8	0.8	U				0.8	U				0.8	U				0.8	U				0.8	U				0.8	U				0.8	U					
Toluene				--	1	U				1	U				1	U				1	U				1.5	U			1.5	U				1.6	U			1.3	U		
trans-1,2-Dichloroethene				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U					
trans-1,3-Dichloropropene				0.2	0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U					
trans-1,4-Dichloro-2-butene				--	5	U				5	U				5	U				5	U				5	U				5	U				5	U					
Trichlorethene (1,1,2-Trichloroethylene)				3	1	U				1	U				1	U				1	U				1	U				1	U				1	U					
Trichlorofluoromethane				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U					
Vinyl Acetate				--	5	U				5	U				5	U				5	U				5	U				5	U				5	U					
Vinyl Chloride				0.02	0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U					

D: U = Indicates compound was not detected at the given reporting limit; X indicates that the compound was detected in the trip blank and contamination is suspected.
V: E= Exceedance, waiting verification based on subsequent lab data; V= Exceedance verified based on previous lab data; P=Passed, previous exceedance not verified based on current lab data.
Tr: I=Increasing Trend, D=Decreasing Trend;
Ch: Y indicates a change in trend from previous quarter; N means no change in trend.
Values in purple exceed the prediction limit; indicates that a value exceeded the Groundwater Standards
The groundwater standards listed are based on the Washington Administrative Code (WAC) 173-200 groundwater limits as modified by the TMS 91-11 standards.

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result	Pred. Limit
Alkalinity (as cacO ₃)	mg/L	G-01D	10/23/2019		250.0000	280.0000
Ammonia nitrogen	mg-N/L	G-01D	10/23/2019		0.1460	0.5700
Bicarbonate	mg/L	G-01D	10/23/2019		210.0000	280.0000
Chemical oxygen demand	mg/L	G-01D	10/23/2019	ND	10.0000	160.0000
Chloride	mg/L	G-01D	10/23/2019		6.0000	9.3242
Conductivity	umhos/cm	G-01D	10/23/2019		600.0000	510.0000
Dissolved antimony	mg/L	G-01D	10/23/2019	ND	0.0003	0.0100
Dissolved arsenic	mg/L	G-01D	10/23/2019		0.0006	27.9618
Dissolved barium	mg/L	G-01D	10/23/2019		0.0009	0.0037
Dissolved beryllium	mg/L	G-01D	10/23/2019	ND	0.0005	0.0005
Dissolved cadmium	mg/L	G-01D	10/23/2019	ND	0.0001	0.0001
Dissolved calcium	mg/L	G-01D	10/23/2019		1.0200	6.3200
Dissolved chromium	mg/L	G-01D	10/23/2019	ND	0.0050	0.0136
Dissolved cobalt	mg/L	G-01D	10/23/2019	ND	0.0050	0.0040
Dissolved copper	mg/L	G-01D	10/23/2019	ND	0.0050	0.0080
Dissolved iron	mg/L	G-01D	10/23/2019		0.0820	21.2882
Dissolved lead	mg/L	G-01D	10/23/2019		0.0002	0.0023
Dissolved magnesium	mg/L	G-01D	10/23/2019	ND	0.2000	2.3300
Dissolved manganese	mg/L	G-01D	10/23/2019	ND	0.0050	7.4921
Dissolved nickel	mg/L	G-01D	10/23/2019		0.0050	0.0060
Dissolved potassium	mg/L	G-01D	10/23/2019		0.3900	1.6000
Dissolved selenium	mg/L	G-01D	10/23/2019	ND	0.0003	0.0025
Dissolved silver	mg/L	G-01D	10/23/2019	ND	0.0001	0.0007
Dissolved sodium	mg/L	G-01D	10/23/2019		153.0000	127.2340
Dissolved thallium	mg/L	G-01D	10/23/2019	ND	0.0001	0.0030
Dissolved thallium	mg/L	G-01D	10/23/2019	ND	0.0100	0.0100
Dissolved zinc	mg/L	G-01D	10/23/2019	ND	0.0050	0.0120
Nitrate nitrogen	mg-N/L	G-01D	10/23/2019	ND	0.0100	0.2100
Nitrite nitrogen	mg-N/L	G-01D	10/23/2019	ND	0.0020	0.6000
pH	std units	G-01D	10/23/2019		9.2900	6.02 - 10.02
Sulfate	mg/L	G-01D	10/23/2019		43.2000	66.0500
Total dissolved solids	mg/L	G-01D	10/23/2019		350.0000	480.0000
Total organic carbon	mg/L	G-01D	10/23/2019		2.3000	63.0000
Alkalinity (as cacO ₃)	mg/L	G-02D	10/22/2019		110.0000	280.0000
Ammonia nitrogen	mg-N/L	G-02D	10/22/2019		0.0570	0.5700
Bicarbonate	mg/L	G-02D	10/22/2019		100.0000	280.0000
Chemical oxygen demand	mg/L	G-02D	10/22/2019	ND	10.0000	160.0000
Chloride	mg/L	G-02D	10/22/2019		4.8300	9.3242
Conductivity	umhos/cm	G-02D	10/22/2019		390.0000	510.0000
Dissolved antimony	mg/L	G-02D	10/22/2019	ND	0.0003	0.0100
Dissolved arsenic	mg/L	G-02D	10/22/2019		0.0037	27.9618
Dissolved barium	mg/L	G-02D	10/22/2019		0.0011	0.0037
Dissolved beryllium	mg/L	G-02D	10/22/2019	ND	0.0005	0.0005
Dissolved cadmium	mg/L	G-02D	10/22/2019	ND	0.0001	0.0001
Dissolved calcium	mg/L	G-02D	10/22/2019		0.5100	6.3200
Dissolved chromium	mg/L	G-02D	10/22/2019	ND	0.0050	0.0136
Dissolved cobalt	mg/L	G-02D	10/22/2019	ND	0.0050	0.0040
Dissolved copper	mg/L	G-02D	10/22/2019		0.0090	0.0080
Dissolved iron	mg/L	G-02D	10/22/2019		0.1150	21.2882
Dissolved lead	mg/L	G-02D	10/22/2019		0.0005	0.0023
Dissolved magnesium	mg/L	G-02D	10/22/2019	ND	0.2000	2.3300
Dissolved manganese	mg/L	G-02D	10/22/2019		0.0050	7.4921
Dissolved nickel	mg/L	G-02D	10/22/2019		0.0070	0.0060
Dissolved potassium	mg/L	G-02D	10/22/2019		0.2200	1.6000
Dissolved selenium	mg/L	G-02D	10/22/2019	ND	0.0003	0.0025
Dissolved silver	mg/L	G-02D	10/22/2019	ND	0.0001	0.0007
Dissolved sodium	mg/L	G-02D	10/22/2019		87.9000	127.2340
Dissolved thallium	mg/L	G-02D	10/22/2019	ND	0.0001	0.0030
Dissolved vanadium	mg/L	G-02D	10/22/2019	ND	0.0100	0.0100
Dissolved zinc	mg/L	G-02D	10/22/2019	ND	0.0050	0.0120
Nitrate nitrogen	mg-N/L	G-02D	10/22/2019		0.5800	0.2100
Nitrite nitrogen	mg-N/L	G-02D	10/22/2019	ND	0.0020	0.6000
pH	std units	G-02D	10/22/2019		7.6100	6.02 - 10.02
Sulfate	mg/L	G-02D	10/22/2019		73.7000	66.0500
Total dissolved solids	mg/L	G-02D	10/22/2019		220.0000	480.0000
Total organic carbon	mg/L	G-02D	10/22/2019		0.8800	63.0000
Alkalinity (as cacO ₃)	mg/L	G-06B	10/22/2019		240.0000	280.0000

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result	Pred. Limit
Ammonia nitrogen	mg-N/L	G-06B	10/22/2019		0.0690	0.5700
Bicarbonate	mg/L	G-06B	10/22/2019		210.0000	280.0000
Chemical oxygen demand	mg/L	G-06B	10/22/2019	ND	10.0000	160.0000
Chloride	mg/L	G-06B	10/22/2019		6.9800	9.3242
Conductivity	umhos/cm	G-06B	10/22/2019		690.0000	510.0000
Dissolved antimony	mg/L	G-06B	10/22/2019	ND	0.0003	0.0100
Dissolved arsenic	mg/L	G-06B	10/22/2019		0.0040	27.9618
Dissolved barium	mg/L	G-06B	10/22/2019		0.0009	0.0037
Dissolved beryllium	mg/L	G-06B	10/22/2019	ND	0.0005	0.0005
Dissolved cadmium	mg/L	G-06B	10/22/2019	ND	0.0001	0.0001
Dissolved calcium	mg/L	G-06B	10/22/2019		1.0500	6.3200
Dissolved chromium	mg/L	G-06B	10/22/2019	ND	0.0050	0.0136
Dissolved cobalt	mg/L	G-06B	10/22/2019	ND	0.0050	0.0040
Dissolved copper	mg/L	G-06B	10/22/2019	ND	0.0050	0.0080
Dissolved iron	mg/L	G-06B	10/22/2019		0.0400	21.2882
Dissolved lead	mg/L	G-06B	10/22/2019		0.0002	0.0023
Dissolved magnesium	mg/L	G-06B	10/22/2019	ND	0.2000	2.3300
Dissolved manganese	mg/L	G-06B	10/22/2019	ND	0.0050	7.4921
Dissolved nickel	mg/L	G-06B	10/22/2019		0.0070	0.0060
Dissolved potassium	mg/L	G-06B	10/22/2019		0.3700	1.6000
Dissolved selenium	mg/L	G-06B	10/22/2019	ND	0.0003	0.0025
Dissolved silver	mg/L	G-06B	10/22/2019	ND	0.0001	0.0007
Dissolved sodium	mg/L	G-06B	10/22/2019		177.0000	127.2340
Dissolved thallium	mg/L	G-06B	10/22/2019	ND	0.0001	0.0030
Dissolved vanadium	mg/L	G-06B	10/22/2019	ND	0.0100	0.0100
Dissolved zinc	mg/L	G-06B	10/22/2019	ND	0.0050	0.0120
Nitrate nitrogen	mg-N/L	G-06B	10/22/2019		0.1800	0.2100
Nitrite nitrogen	mg-N/L	G-06B	10/22/2019		0.0030	0.6000
pH	std units	G-06B	10/22/2019		7.9500	6.02 - 10.02
Sulfate	mg/L	G-06B	10/22/2019		77.2000	66.0500
Total dissolved solids	mg/L	G-06B	10/22/2019		440.0000	480.0000
Total organic carbon	mg/L	G-06B	10/22/2019		2.9000	63.0000
Alkalinity (as cacO3)	mg/L	G-08D2	10/22/2019		200.0000	280.0000
Ammonia nitrogen	mg-N/L	G-08D2	10/22/2019		0.1870	0.5700
Bicarbonate	mg/L	G-08D2	10/22/2019		130.0000	280.0000
Chemical oxygen demand	mg/L	G-08D2	10/22/2019		11.0000	160.0000
Chloride	mg/L	G-08D2	10/22/2019		2.9950	9.3242
Conductivity	umhos/cm	G-08D2	10/22/2019		465.0000	510.0000
Dissolved antimony	mg/L	G-08D2	10/22/2019	ND	0.0003	0.0100
Dissolved arsenic	mg/L	G-08D2	10/22/2019		0.0008	27.9618
Dissolved barium	mg/L	G-08D2	10/22/2019		0.0028	0.0037
Dissolved beryllium	mg/L	G-08D2	10/22/2019	ND	0.0005	0.0005
Dissolved cadmium	mg/L	G-08D2	10/22/2019	ND	0.0001	0.0001
Dissolved calcium	mg/L	G-08D2	10/22/2019		1.2100	6.3200
Dissolved chromium	mg/L	G-08D2	10/22/2019	ND	0.0050	0.0136
Dissolved cobalt	mg/L	G-08D2	10/22/2019	ND	0.0050	0.0040
Dissolved copper	mg/L	G-08D2	10/22/2019	ND	0.0050	0.0080
Dissolved iron	mg/L	G-08D2	10/22/2019		0.8920	21.2882
Dissolved lead	mg/L	G-08D2	10/22/2019		0.0004	0.0023
Dissolved magnesium	mg/L	G-08D2	10/22/2019		0.2400	2.3300
Dissolved manganese	mg/L	G-08D2	10/22/2019		0.0335	7.4921
Dissolved nickel	mg/L	G-08D2	10/22/2019	ND	0.0050	0.0060
Dissolved potassium	mg/L	G-08D2	10/22/2019		0.2800	1.6000
Dissolved selenium	mg/L	G-08D2	10/22/2019	ND	0.0003	0.0025
Dissolved silver	mg/L	G-08D2	10/22/2019	ND	0.0001	0.0007
Dissolved sodium	mg/L	G-08D2	10/22/2019		110.5000	127.2340
Dissolved thallium	mg/L	G-08D2	10/22/2019	ND	0.0001	0.0030
Dissolved vanadium	mg/L	G-08D2	10/22/2019	ND	0.0100	0.0100
Dissolved zinc	mg/L	G-08D2	10/22/2019	ND	0.0050	0.0120
Nitrate nitrogen	mg-N/L	G-08D2	10/22/2019	ND	0.0100	0.2100
Nitrite nitrogen	mg-N/L	G-08D2	10/22/2019	ND	0.0020	0.6000
pH	std units	G-08D2	10/22/2019		9.9300	6.02 - 10.02
Sulfate	mg/L	G-08D2	10/22/2019		45.0000	66.0500
Total dissolved solids	mg/L	G-08D2	10/22/2019		355.0000	480.0000
Total organic carbon	mg/L	G-08D2	10/22/2019		2.4500	63.0000
Alkalinity (as cacO3)	mg/L	G-09D	10/23/2019		120.0000	280.0000
Ammonia nitrogen	mg-N/L	G-09D	10/23/2019		0.1550	0.5700

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result		Pred. Limit
Bicarbonate	mg/L	G-09D	10/23/2019		100.0000		280.0000
Chemical oxygen demand	mg/L	G-09D	10/23/2019		26.0000		160.0000
Chloride	mg/L	G-09D	10/23/2019		19.3000	*	9.3242
Conductivity	umhos/cm	G-09D	10/23/2019		830.0000	***	510.0000
Dissolved antimony	mg/L	G-09D	10/23/2019	ND	0.0003		0.0100
Dissolved arsenic	mg/L	G-09D	10/23/2019		0.0028		27.9618
Dissolved barium	mg/L	G-09D	10/23/2019		0.0005		0.0037
Dissolved beryllium	mg/L	G-09D	10/23/2019	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-09D	10/23/2019	ND	0.0001		0.0001
Dissolved calcium	mg/L	G-09D	10/23/2019		1.7000		6.3200
Dissolved chromium	mg/L	G-09D	10/23/2019	ND	0.0050		0.0136
Dissolved cobalt	mg/L	G-09D	10/23/2019	ND	0.0050		0.0040
Dissolved copper	mg/L	G-09D	10/23/2019		0.0050	**	0.0080
Dissolved iron	mg/L	G-09D	10/23/2019		0.0540		21.2882
Dissolved lead	mg/L	G-09D	10/23/2019		0.0008		0.0023
Dissolved magnesium	mg/L	G-09D	10/23/2019	ND	0.2000		2.3300
Dissolved manganese	mg/L	G-09D	10/23/2019		0.0250		7.4921
Dissolved nickel	mg/L	G-09D	10/23/2019		0.0060	**	0.0060
Dissolved potassium	mg/L	G-09D	10/23/2019		0.4700		1.6000
Dissolved selenium	mg/L	G-09D	10/23/2019	ND	0.0003		0.0025
Dissolved silver	mg/L	G-09D	10/23/2019	ND	0.0001		0.0007
Dissolved sodium	mg/L	G-09D	10/23/2019		189.0000	***	127.2340
Dissolved thallium	mg/L	G-09D	10/23/2019	ND	0.0001		0.0030
Dissolved vanadium	mg/L	G-09D	10/23/2019	ND	0.0100		0.0100
Dissolved zinc	mg/L	G-09D	10/23/2019	ND	0.0050		0.0120
Nitrate nitrogen	mg-N/L	G-09D	10/23/2019		0.0580		0.2100
Nitrite nitrogen	mg-N/L	G-09D	10/23/2019		0.0040		0.6000
pH	std units	G-09D	10/23/2019		8.1200		6.02 - 10.02
Sulfate	mg/L	G-09D	10/23/2019		160.0000	***	66.0500
Total dissolved solids	mg/L	G-09D	10/23/2019		450.0000		480.0000
Total organic carbon	mg/L	G-09D	10/23/2019		4.6000		63.0000
Alkalinity (as cacO3)	mg/L	G-10D	10/23/2019		480.0000	***	280.0000
Ammonia nitrogen	mg-N/L	G-10D	10/23/2019		0.3600		0.5700
Bicarbonate	mg/L	G-10D	10/23/2019		480.0000	***	280.0000
Chemical oxygen demand	mg/L	G-10D	10/23/2019		26.0000		160.0000
Chloride	mg/L	G-10D	10/23/2019		17.9000	***	9.3242
Conductivity	umhos/cm	G-10D	10/23/2019		1600.0000	***	510.0000
Dissolved antimony	mg/L	G-10D	10/23/2019	ND	0.0003		0.0100
Dissolved arsenic	mg/L	G-10D	10/23/2019		0.0012		27.9618
Dissolved barium	mg/L	G-10D	10/23/2019		0.0025		0.0037
Dissolved beryllium	mg/L	G-10D	10/23/2019	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-10D	10/23/2019	ND	0.0001		0.0001
Dissolved calcium	mg/L	G-10D	10/23/2019		21.3000	***	6.3200
Dissolved chromium	mg/L	G-10D	10/23/2019	ND	0.0050		0.0136
Dissolved cobalt	mg/L	G-10D	10/23/2019	ND	0.0050		0.0040
Dissolved copper	mg/L	G-10D	10/23/2019	ND	0.0050		0.0080
Dissolved iron	mg/L	G-10D	10/23/2019		0.5170		21.2882
Dissolved lead	mg/L	G-10D	10/23/2019	ND	0.0001		0.0023
Dissolved magnesium	mg/L	G-10D	10/23/2019		1.7600		2.3300
Dissolved manganese	mg/L	G-10D	10/23/2019		0.3430		7.4921
Dissolved nickel	mg/L	G-10D	10/23/2019		0.0070	*	0.0060
Dissolved potassium	mg/L	G-10D	10/23/2019		1.5100	**	1.6000
Dissolved selenium	mg/L	G-10D	10/23/2019	ND	0.0003		0.0025
Dissolved silver	mg/L	G-10D	10/23/2019	ND	0.0001		0.0007
Dissolved sodium	mg/L	G-10D	10/23/2019		363.0000	***	127.2340
Dissolved thallium	mg/L	G-10D	10/23/2019	ND	0.0001		0.0030
Dissolved vanadium	mg/L	G-10D	10/23/2019	ND	0.0100		0.0100
Dissolved zinc	mg/L	G-10D	10/23/2019	ND	0.0050		0.0120
Nitrate nitrogen	mg-N/L	G-10D	10/23/2019	ND	0.0100		0.2100
Nitrite nitrogen	mg-N/L	G-10D	10/23/2019	ND	0.0020		0.6000
pH	std units	G-10D	10/23/2019		6.7600		6.02 - 10.02
Sulfate	mg/L	G-10D	10/23/2019		293.0000	***	66.0500
Total dissolved solids	mg/L	G-10D	10/23/2019		1000.0000	***	480.0000
Total organic carbon	mg/L	G-10D	10/23/2019		4.0000		63.0000
Alkalinity (as cacO3)	mg/L	G-13D	10/22/2019		170.0000		280.0000
Ammonia nitrogen	mg-N/L	G-13D	10/22/2019		0.0560		0.5700
Bicarbonate	mg/L	G-13D	10/22/2019		130.0000		280.0000

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result	Pred. Limit
Chemical oxygen demand	mg/L	G-13D	10/22/2019		12.0000	160.0000
Chloride	mg/L	G-13D	10/22/2019		9.5700 *	9.3242
Conductivity	umhos/cm	G-13D	10/22/2019		450.0000	510.0000
Dissolved antimony	mg/L	G-13D	10/22/2019	ND	0.0003	0.0100
Dissolved arsenic	mg/L	G-13D	10/22/2019		0.0001	27.9618
Dissolved barium	mg/L	G-13D	10/22/2019	ND	0.0005	0.0037
Dissolved beryllium	mg/L	G-13D	10/22/2019	ND	0.0005	0.0005
Dissolved cadmium	mg/L	G-13D	10/22/2019	ND	0.0001	0.0001
Dissolved calcium	mg/L	G-13D	10/22/2019		0.5000	6.3200
Dissolved chromium	mg/L	G-13D	10/22/2019	ND	0.0050	0.0136
Dissolved cobalt	mg/L	G-13D	10/22/2019	ND	0.0050	0.0040
Dissolved copper	mg/L	G-13D	10/22/2019	ND	0.0050	0.0080
Dissolved iron	mg/L	G-13D	10/22/2019		0.0130	21.2882
Dissolved lead	mg/L	G-13D	10/22/2019	ND	0.0001	0.0023
Dissolved magnesium	mg/L	G-13D	10/22/2019	ND	0.2000	2.3300
Dissolved manganese	mg/L	G-13D	10/22/2019	ND	0.0050	7.4921
Dissolved nickel	mg/L	G-13D	10/22/2019		0.0050	0.0060
Dissolved potassium	mg/L	G-13D	10/22/2019		0.2400	1.6000
Dissolved selenium	mg/L	G-13D	10/22/2019	ND	0.0003	0.0025
Dissolved silver	mg/L	G-13D	10/22/2019	ND	0.0001	0.0007
Dissolved sodium	mg/L	G-13D	10/22/2019		102.0000	127.2340
Dissolved thallium	mg/L	G-13D	10/22/2019	ND	0.0001	0.0030
Dissolved vanadium	mg/L	G-13D	10/22/2019	ND	0.0100	0.0100
Dissolved zinc	mg/L	G-13D	10/22/2019	ND	0.0050	0.0120
Nitrate nitrogen	mg-N/L	G-13D	10/22/2019	ND	0.0100	0.2100
Nitrite nitrogen	mg-N/L	G-13D	10/22/2019		0.0070	0.6000
pH	std units	G-13D	10/22/2019		9.3700	6.02 - 10.02
Sulfate	mg/L	G-13D	10/22/2019		37.1000	66.0500
Total dissolved solids	mg/L	G-13D	10/22/2019		290.0000	480.0000
Total organic carbon	mg/L	G-13D	10/22/2019		1.4000	63.0000

* - Current value failed - awaiting verification.

** - Current value passed - previous exceedance not verified.

*** - Current value failed - exceedance verified.

**** - Current value passed - awaiting one more verification.

***** - Insufficient background data to compute prediction limit.

ND = Not Detected, Result = detection limit.

Table 5

Summary Statistics and Prediction Limits

Constituent	Units	Detect	N	Mean	SD	alpha	Factor	Pred Limit	Type	Conf
Alkalinity (as caco3)	mg/L	70	70					280.0000	nonpar	0.99
Ammonia nitrogen	mg-N/L	63	63					0.5700	nonpar	0.99
Bicarbonate	mg/L	70	70					280.0000	nonpar	0.99
Chemical oxygen demand	mg/L	17	70					160.0000	nonpar	0.99
Chloride	mg/L	69	70	1.2919	0.3922	0.0100	2.3985	9.3242	lognor	
Conductivity	umhos/cm	70	70					510.0000	nonpar	0.99
Dissolved antimony	mg/L	11	70					0.0100	nonpar	0.99
Dissolved arsenic	mg/L	48	66	-5.9871	3.8775	0.0100	2.4031	27.9618	lognor	
Dissolved barium	mg/L	16	67					0.0037	nonpar	0.99
Dissolved beryllium	mg/L	0	70					0.0005	nonpar	***
Dissolved cadmium	mg/L	9	62					0.0001	nonpar	0.99
Dissolved calcium	mg/L	67	67					6.3200	nonpar	0.99
Dissolved chromium	mg/L	9	70					0.0136	nonpar	0.99
Dissolved cobalt	mg/L	4	70					0.0040	nonpar	0.99
Dissolved copper	mg/L	10	67					0.0080	nonpar	0.99
Dissolved iron	mg/L	33	64	-1.7263	1.9889	0.0100	2.4056	21.2882	lognor	
Dissolved lead	mg/L	22	70					0.0023	nonpar	0.99
Dissolved magnesium	mg/L	43	67					2.3300	nonpar	0.99
Dissolved manganese	mg/L	45	61	-4.1156	2.5438	0.0100	2.4096	7.4921	lognor	
Dissolved nickel	mg/L	2	69					0.0060	nonpar	0.99
Dissolved potassium	mg/L	64	70					1.6000	nonpar	0.99
Dissolved selenium	mg/L	16	69					0.0025	nonpar	0.99
Dissolved silver	mg/L	6	66					0.0007	nonpar	0.99
Dissolved sodium	mg/L	67	67	108.3403	7.8662	0.0100	2.4019	127.2340	normal	
Dissolved thallium	mg/L	7	69					0.0030	nonpar	0.99
Dissolved vanadium	mg/L	1	70					0.0100	nonpar	0.99
Dissolved zinc	mg/L	17	69					0.0120	nonpar	0.99
Nitrate nitrogen	mg-N/L	14	69					0.2100	nonpar	0.99
Nitrite nitrogen	mg-N/L	31	63					0.6000	nonpar	0.99
pH	std units	69	69					6.02- 10.02	nonpar	0.99
Sulfate	mg/L	69	69					66.0500	nonpar	0.99
Total dissolved solids	mg/L	70	70					480.0000	nonpar	0.99
Total organic carbon	mg/L	66	70					63.0000	nonpar	0.99

Conf = confidence level for passing initial test or one of two verification resamples at all downgradient wells for a single constituent (nonparametric test only).

* - Insufficient Data.

** - Calculated limit raised to Manual Reporting Limit.

*** - Nonparametric limit based on ND value.

For transformed data, mean and SD in transformed units and prediction limit in original units.

All sample sizes and statistics are based on outlier free data.

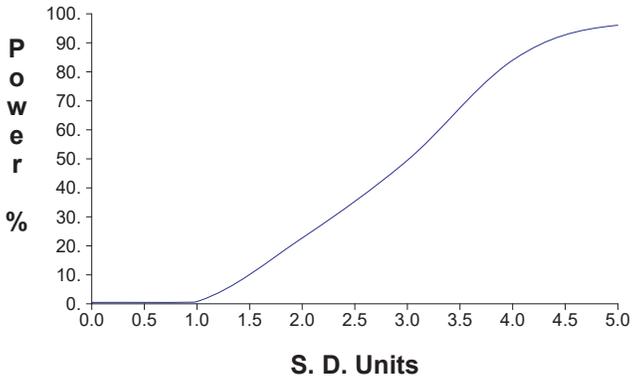
For nonparametric limits, median reporting limits are substituted for extreme reporting limit values.

Appendix C

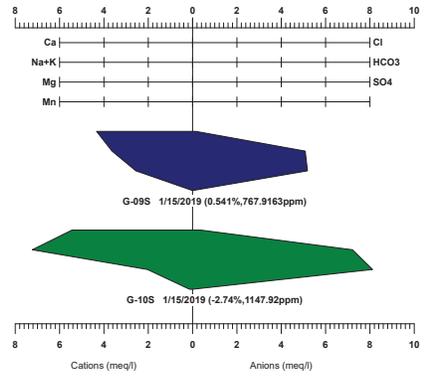
Groundwater Statistical Analyses

Shallow Wells

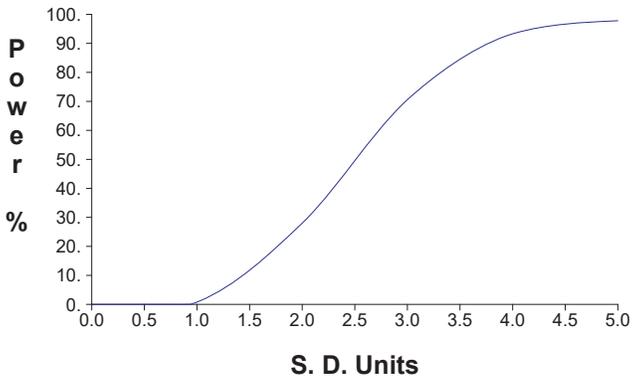
False Positive and False Negative Rates for Current Intra-Well Prediction Limits Monitoring Program



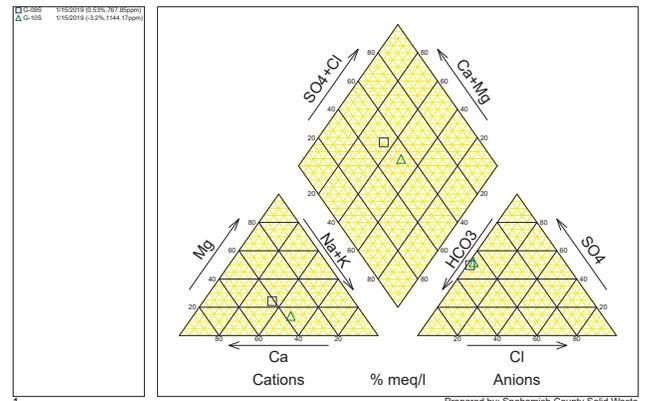
Cathcart Landfill



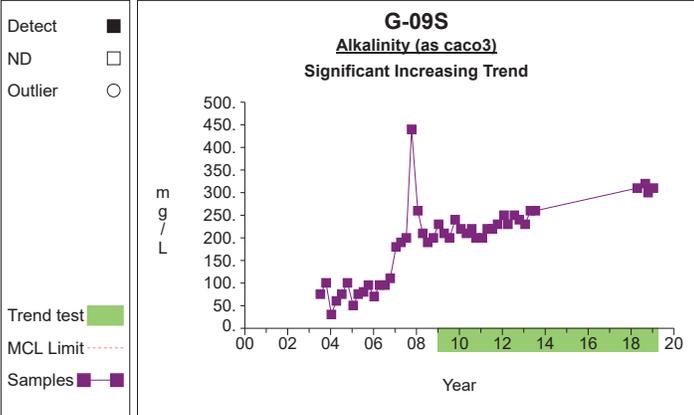
False Positive and False Negative Rates for Current Upgradient vs. Downgradient Monitoring Program



Cathcart Landfill

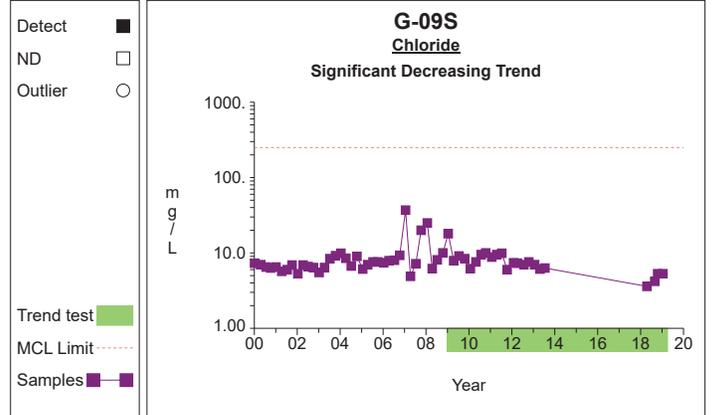


Time Series



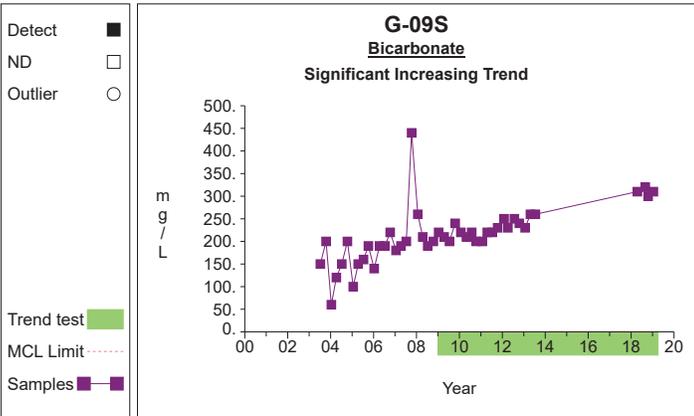
Graph 100

Time Series



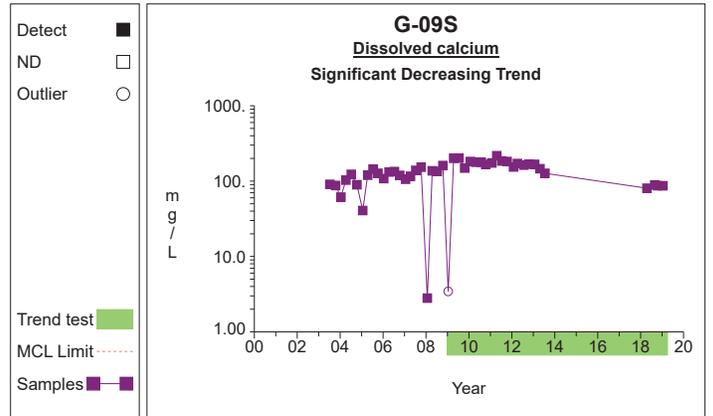
Graph 104

Time Series



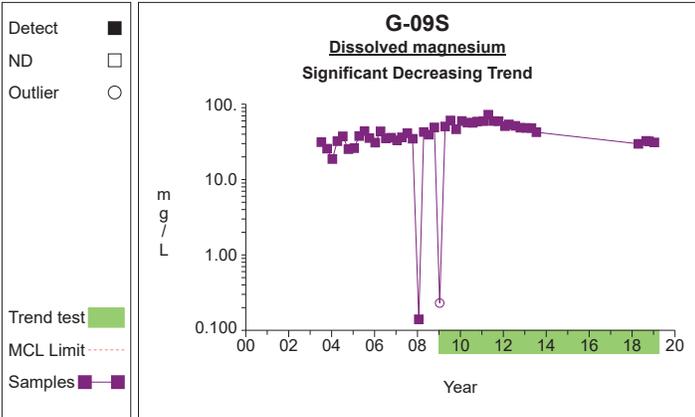
Graph 102

Time Series



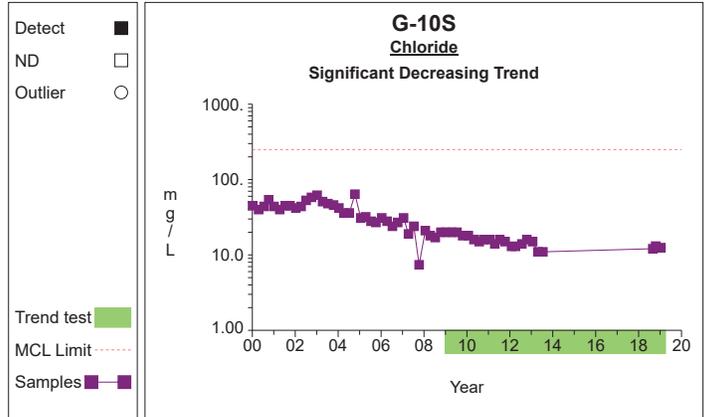
Graph 111

Time Series



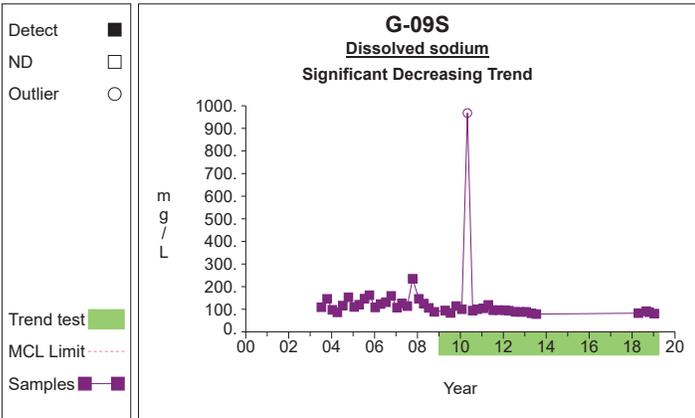
Graph 117

Time Series



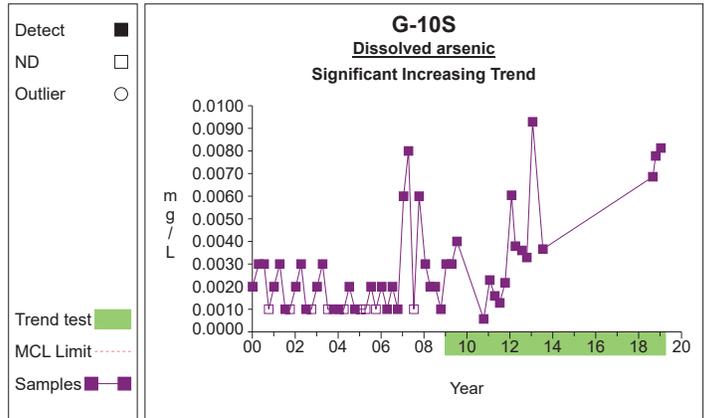
Graph 137

Time Series



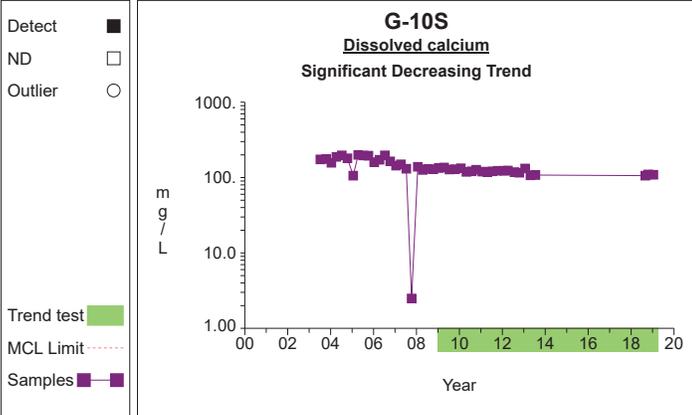
Graph 123

Time Series



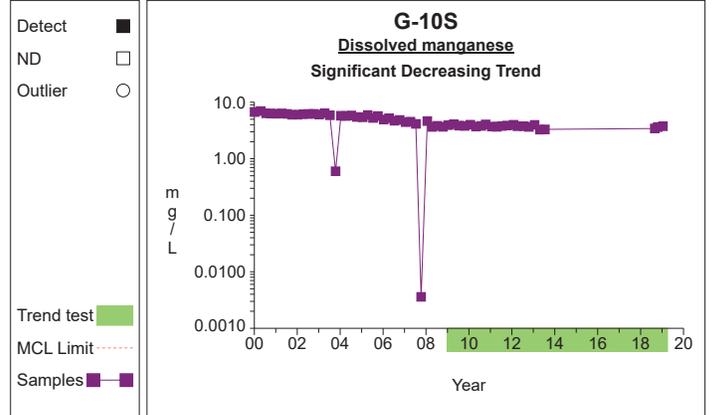
Graph 140

Time Series



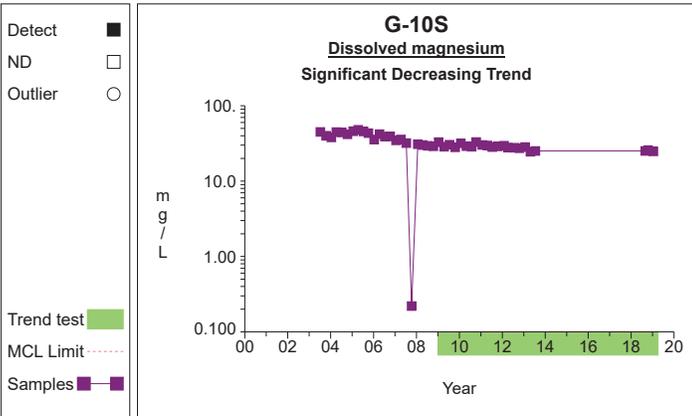
Graph 144

Time Series



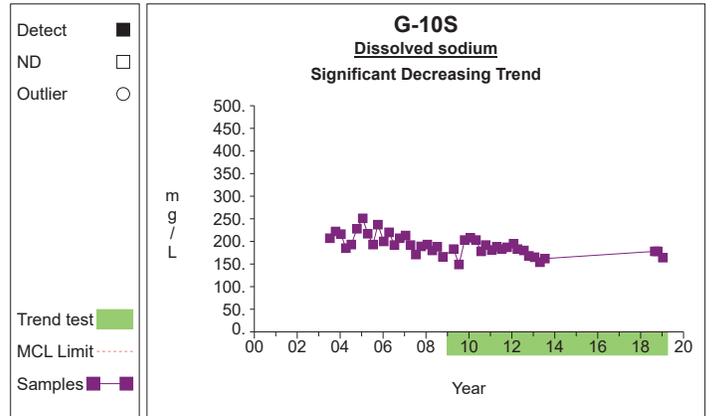
Graph 151

Time Series



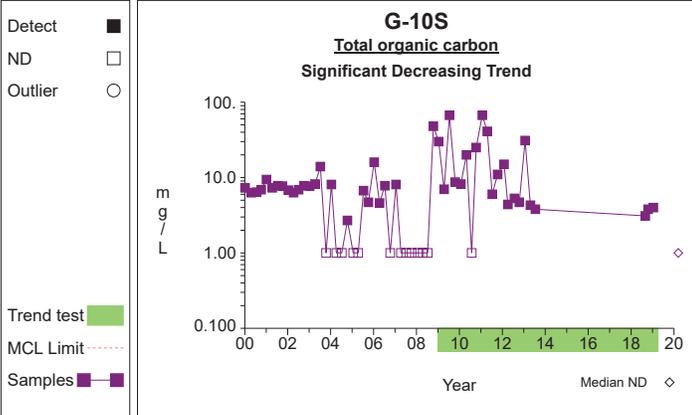
Graph 150

Time Series



Graph 156

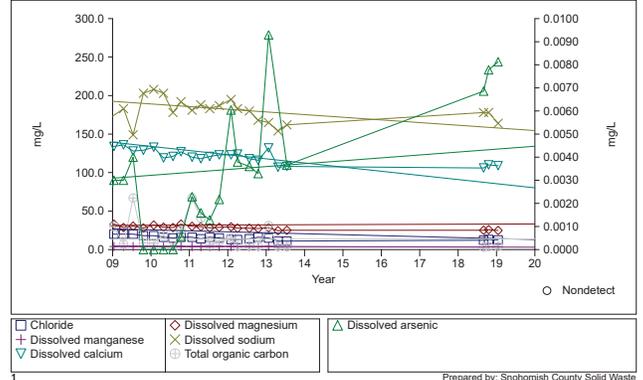
Time Series



Graph 165

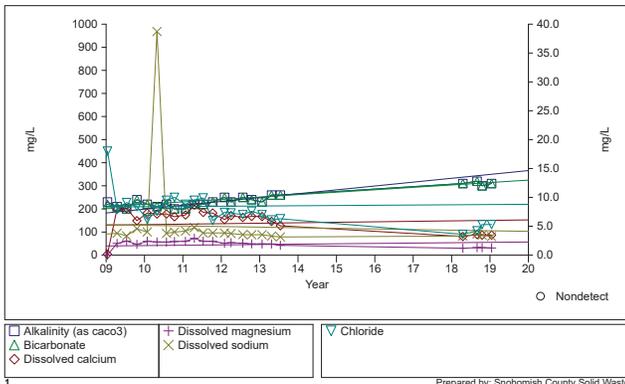
Cathcart Landfill

Time Series Plot for G-10S

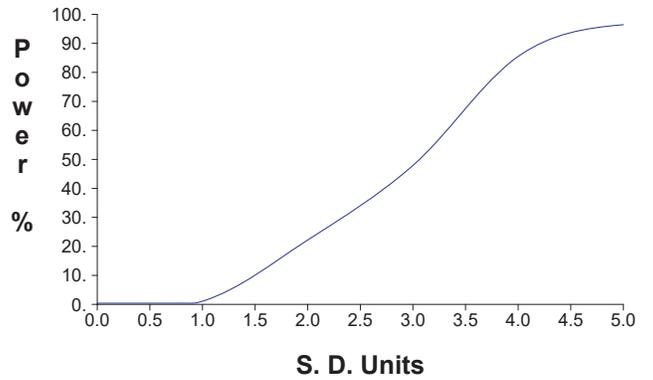


Cathcart Landfill

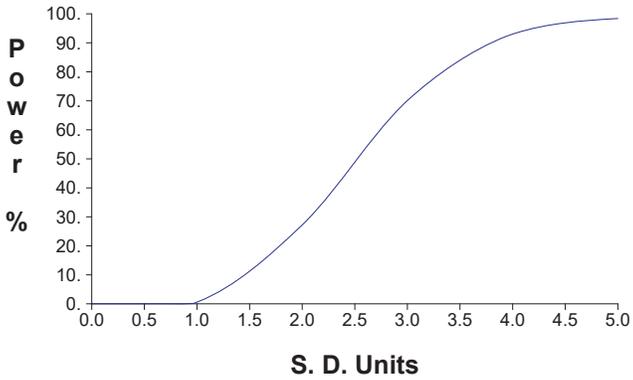
Time Series Plot for G-09S



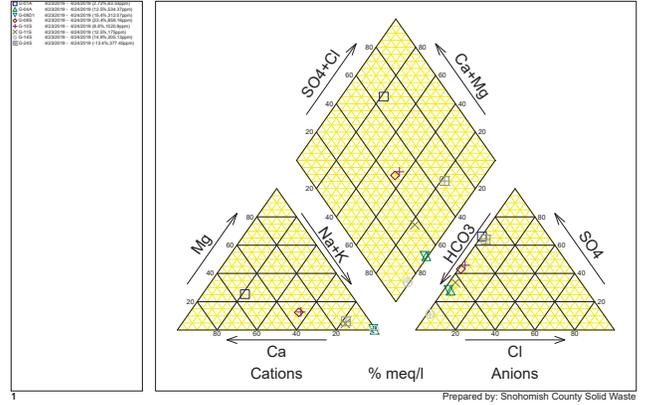
False Positive and False Negative Rates for Current Intra-Well Prediction Limits Monitoring Program



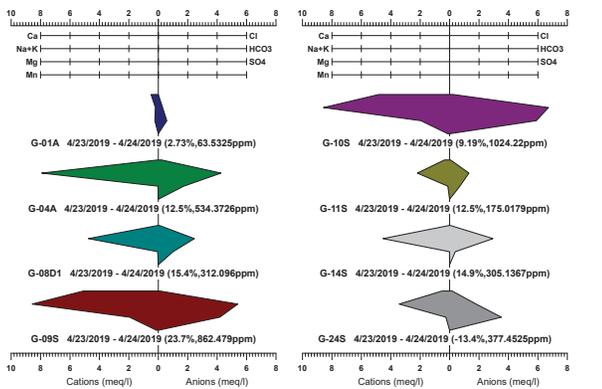
False Positive and False Negative Rates for Current Upgradient vs. Downgradient Monitoring Program



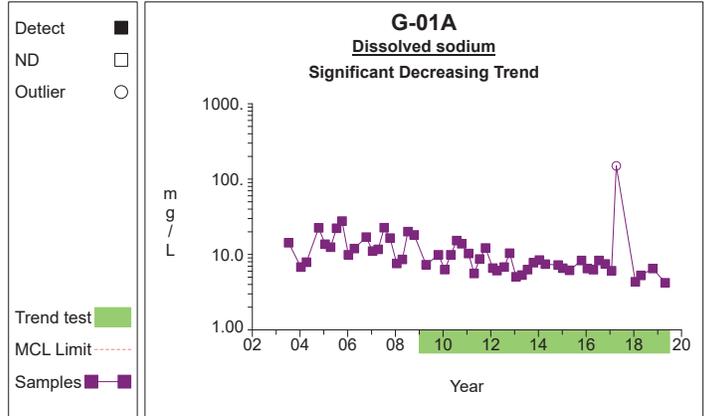
Cathcart Landfill



Cathcart Landfill

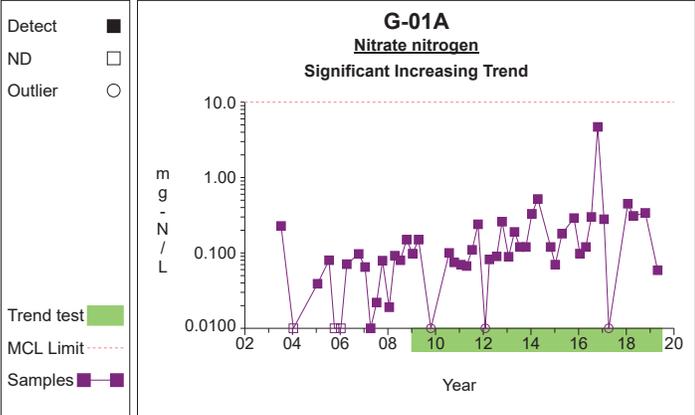


Time Series



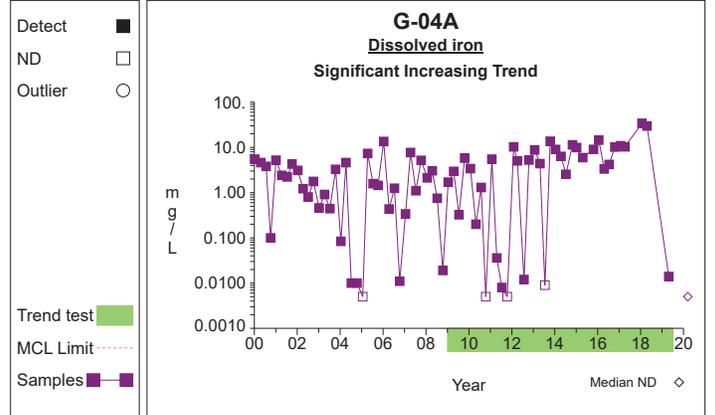
Graph 24

Time Series



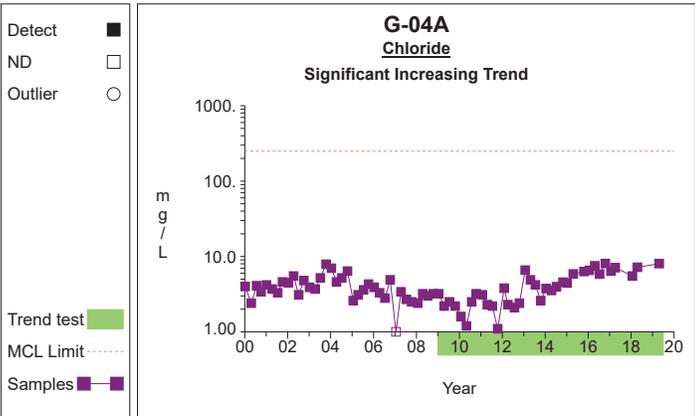
Graph 28

Time Series



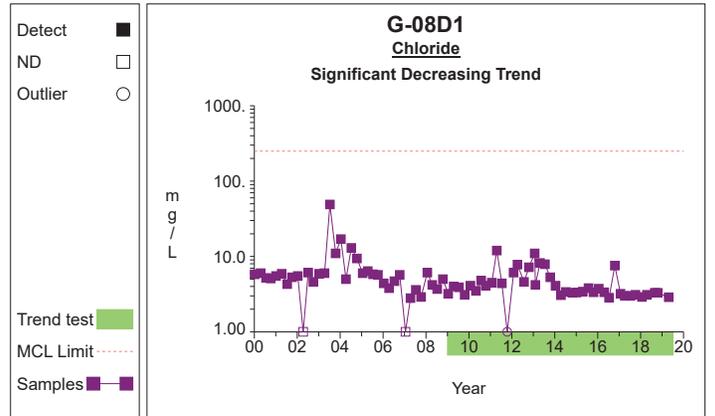
Graph 49

Time Series

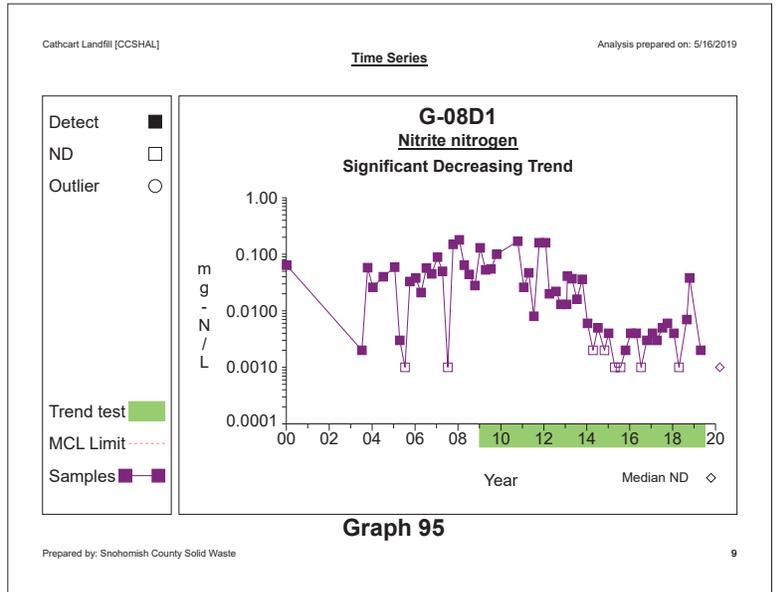
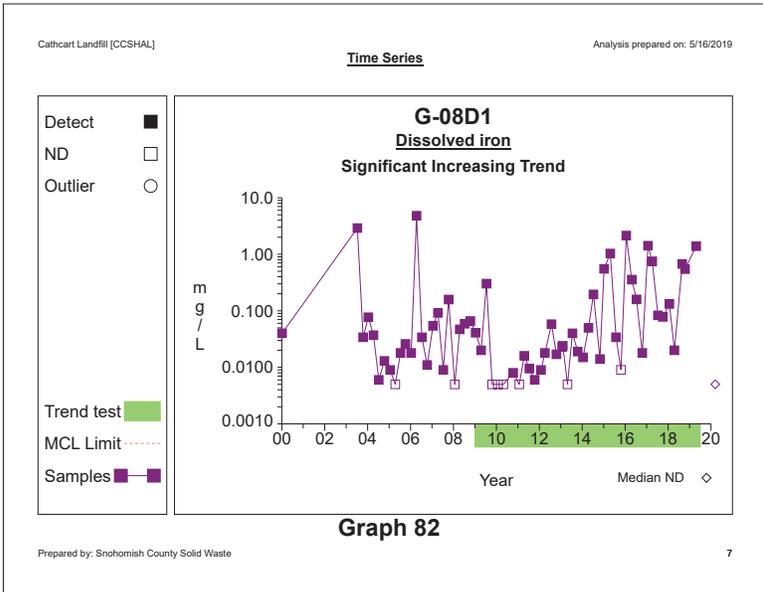
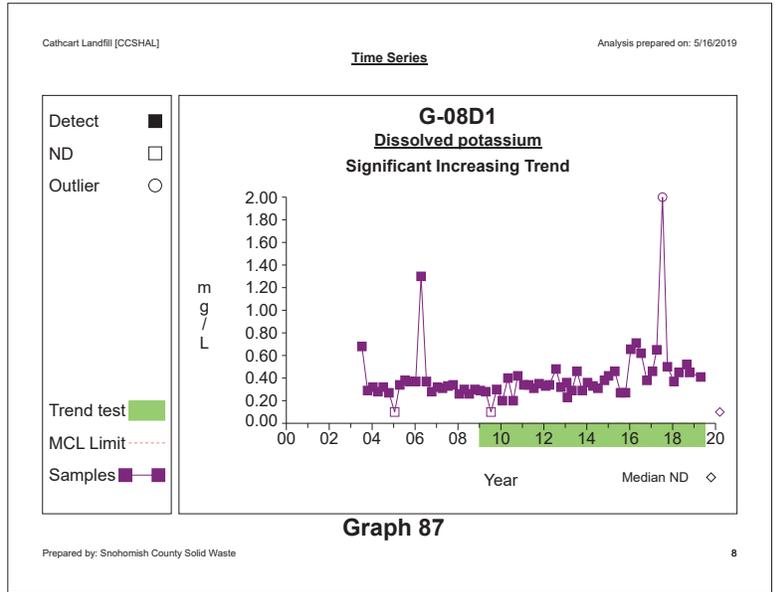
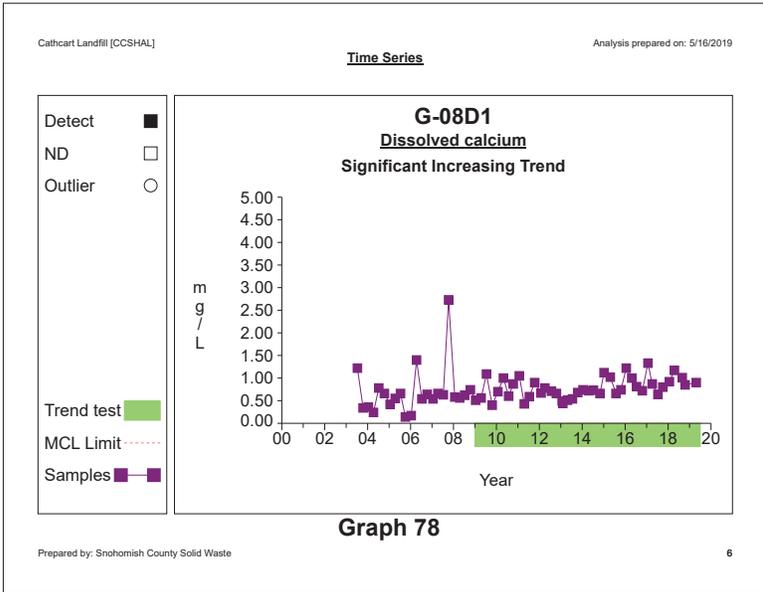


Graph 38

Time Series



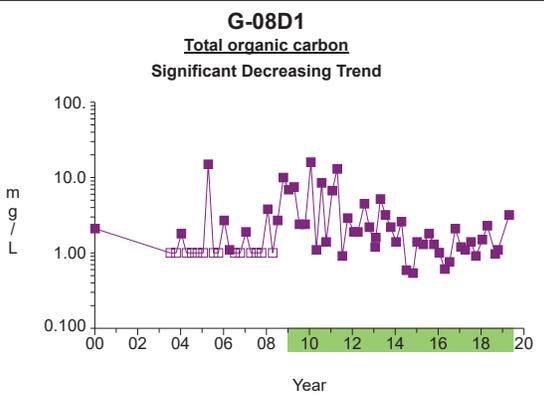
Graph 71



Time Series

- Detect
- ND
- Outlier

- Trend test
- MCL Limit
- Samples

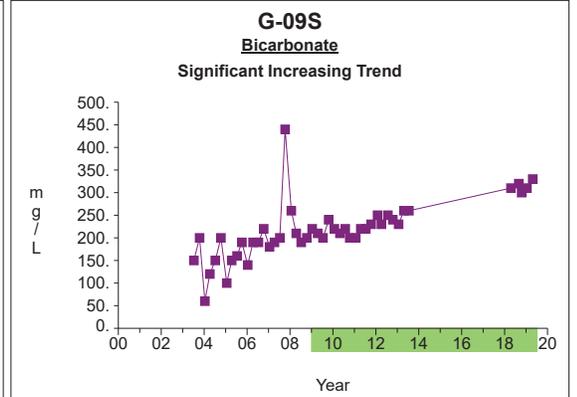


Graph 99

Time Series

- Detect
- ND
- Outlier

- Trend test
- MCL Limit
- Samples

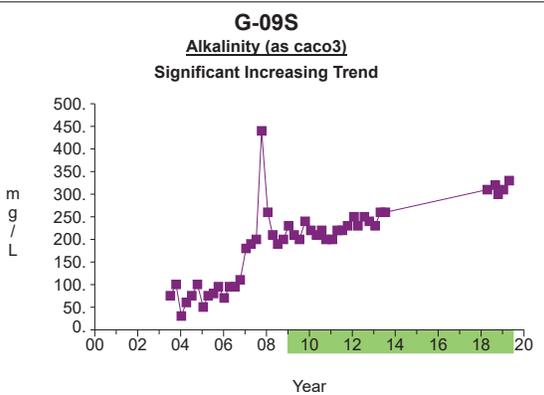


Graph 102

Time Series

- Detect
- ND
- Outlier

- Trend test
- MCL Limit
- Samples

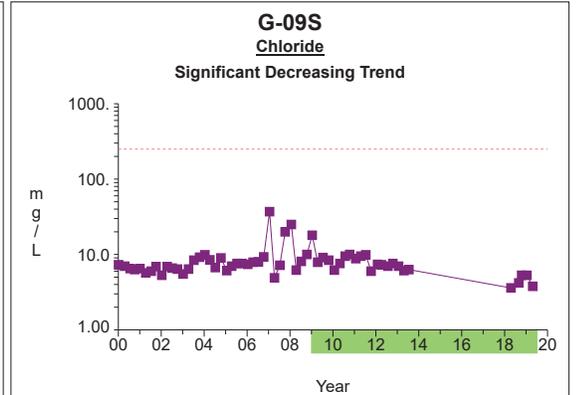


Graph 100

Time Series

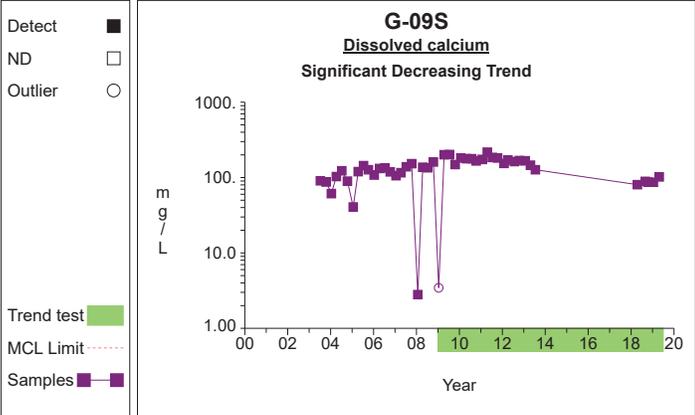
- Detect
- ND
- Outlier

- Trend test
- MCL Limit
- Samples



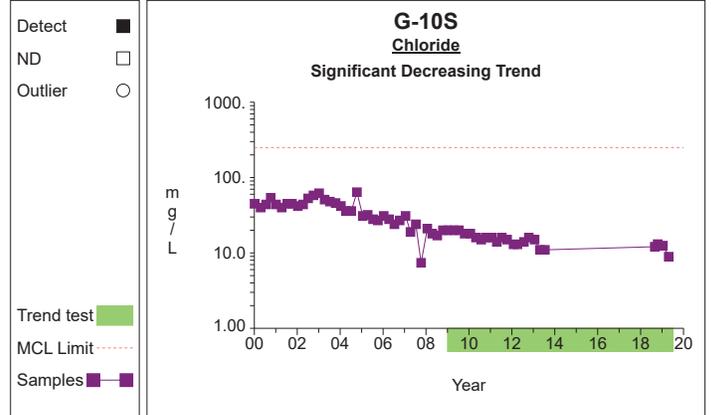
Graph 104

Time Series



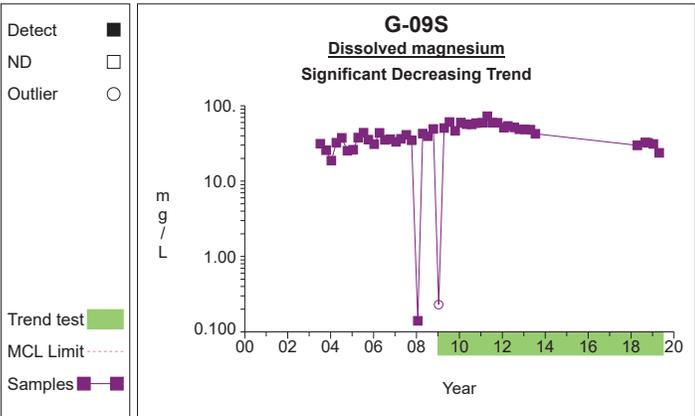
Graph 111

Time Series



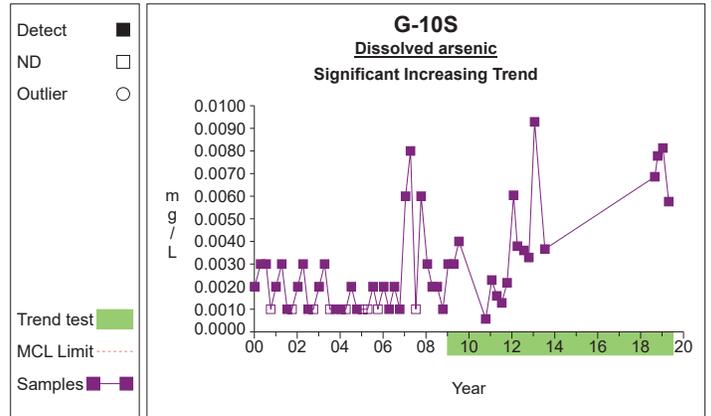
Graph 137

Time Series



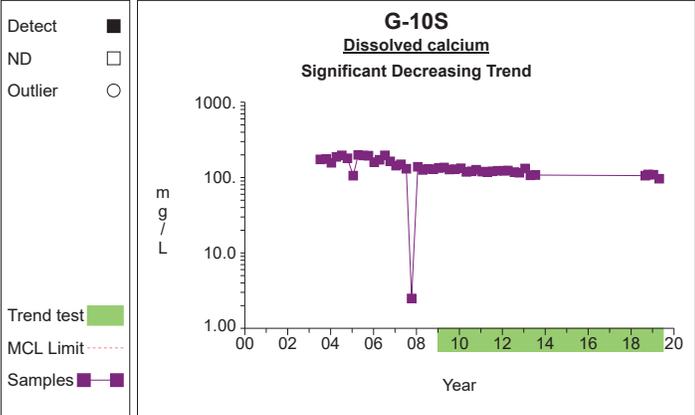
Graph 117

Time Series



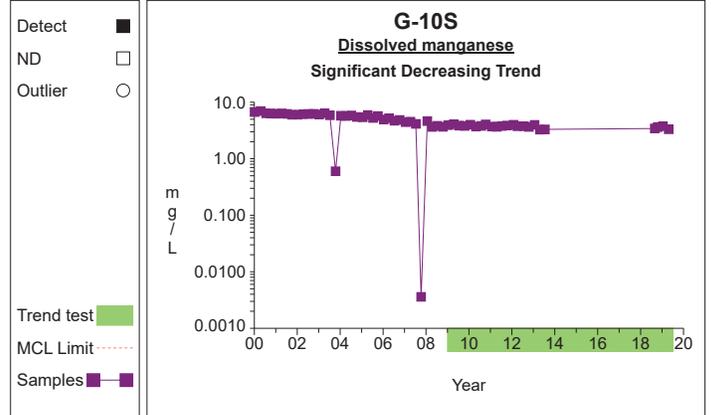
Graph 140

Time Series



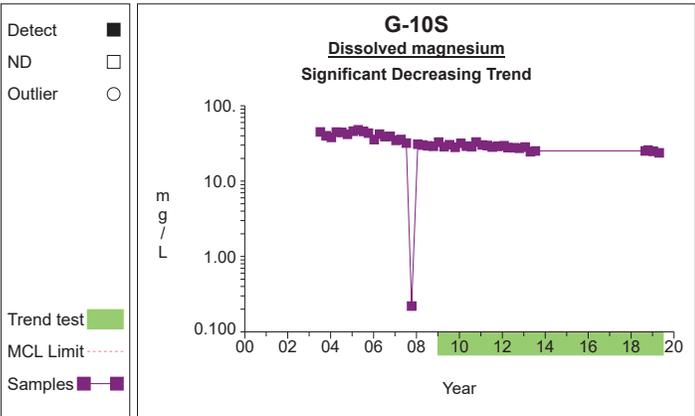
Graph 144

Time Series



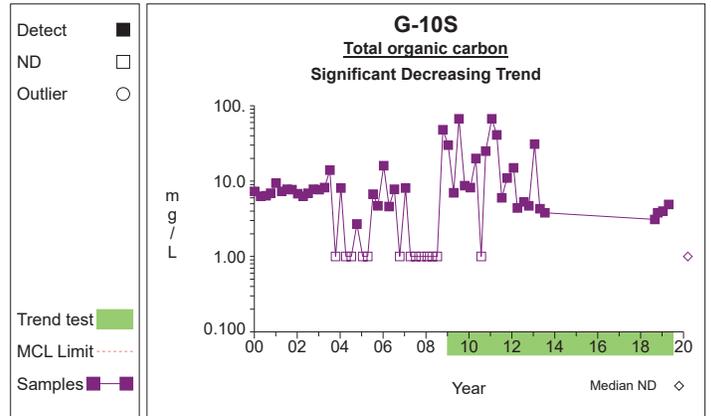
Graph 151

Time Series



Graph 150

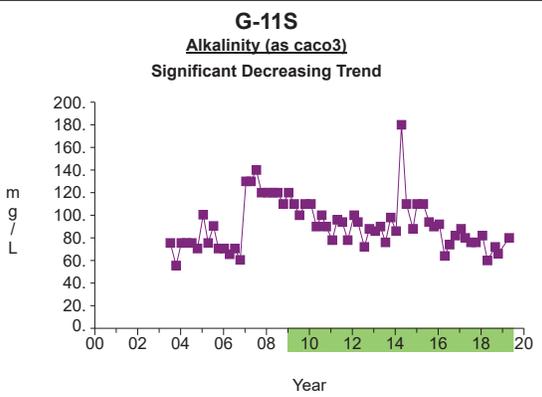
Time Series



Graph 165

Time Series

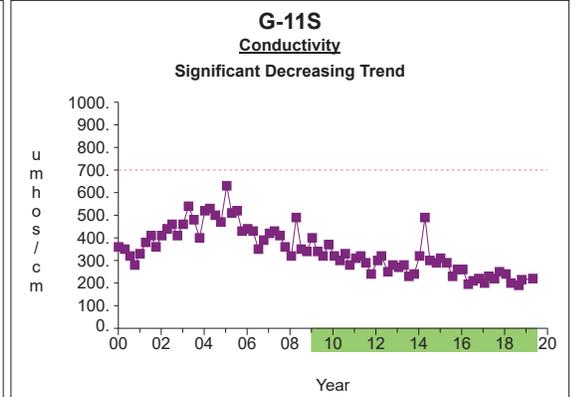
- Detect
- ND
- Outlier



Graph 166

Time Series

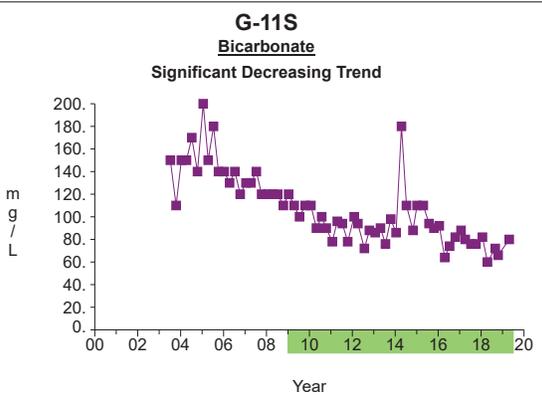
- Detect
- ND
- Outlier



Graph 171

Time Series

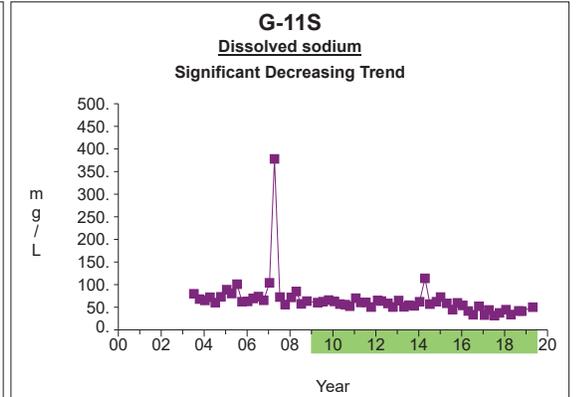
- Detect
- ND
- Outlier



Graph 168

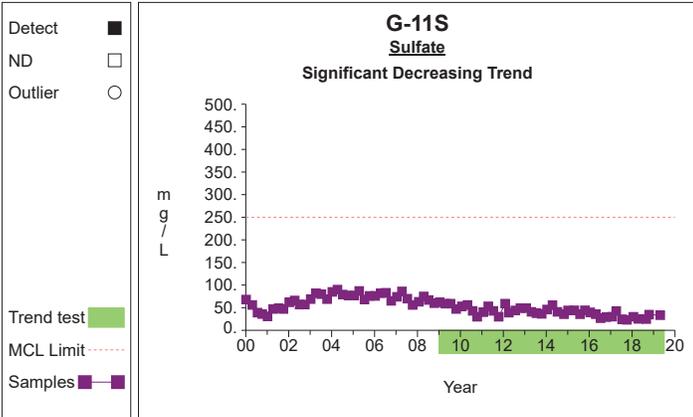
Time Series

- Detect
- ND
- Outlier



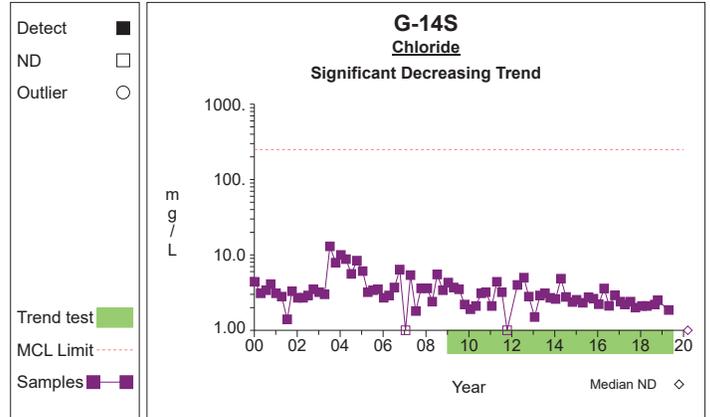
Graph 189

Time Series



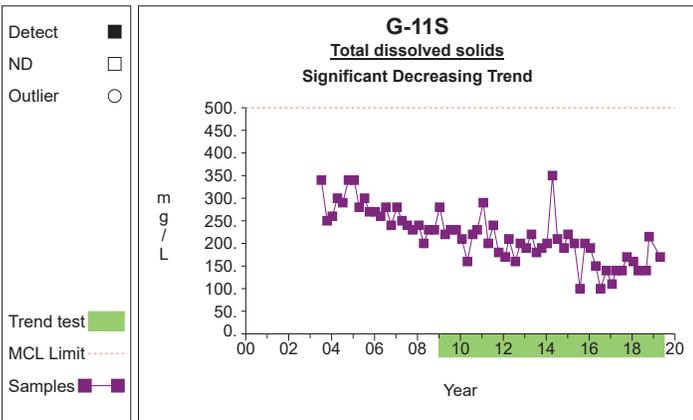
Graph 196

Time Series



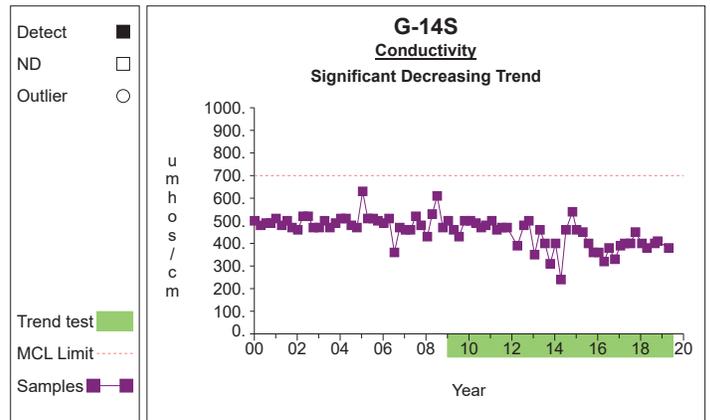
Graph 203

Time Series

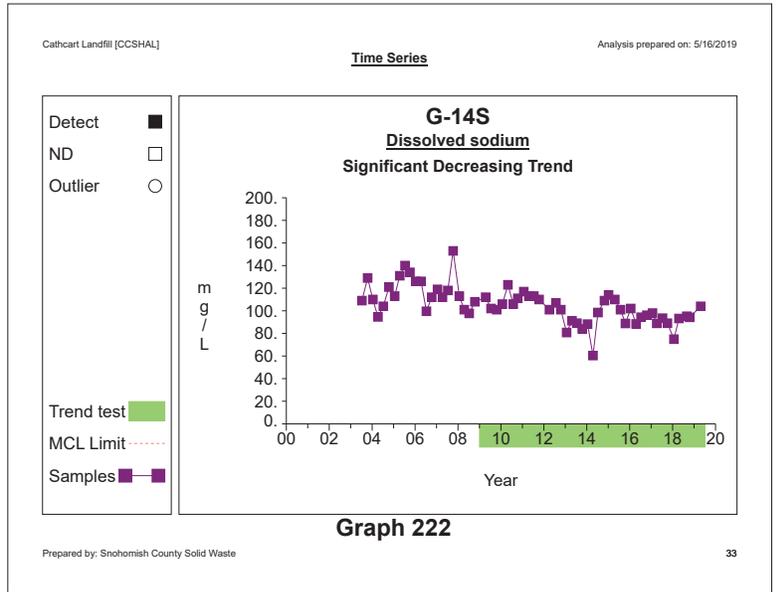
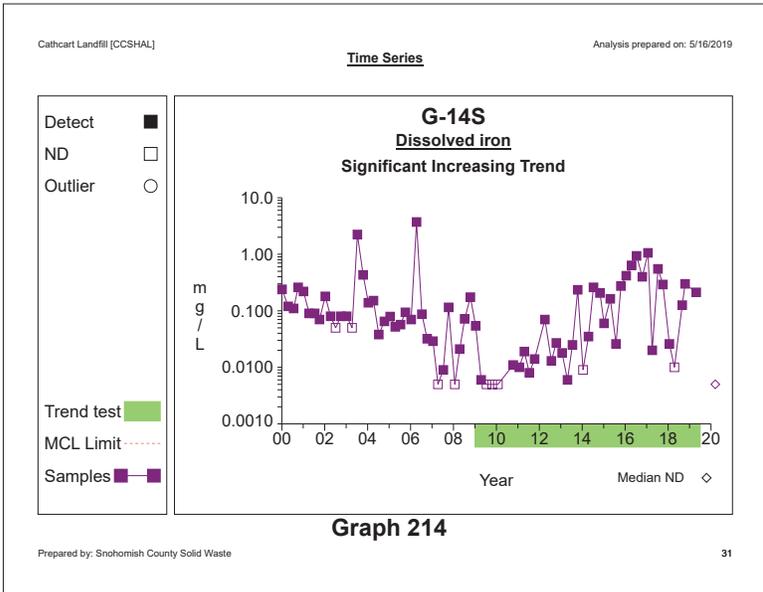
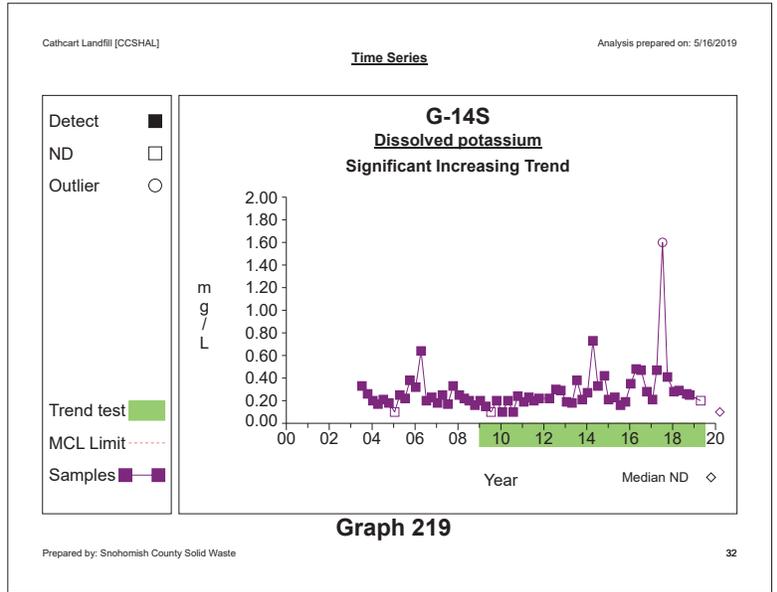
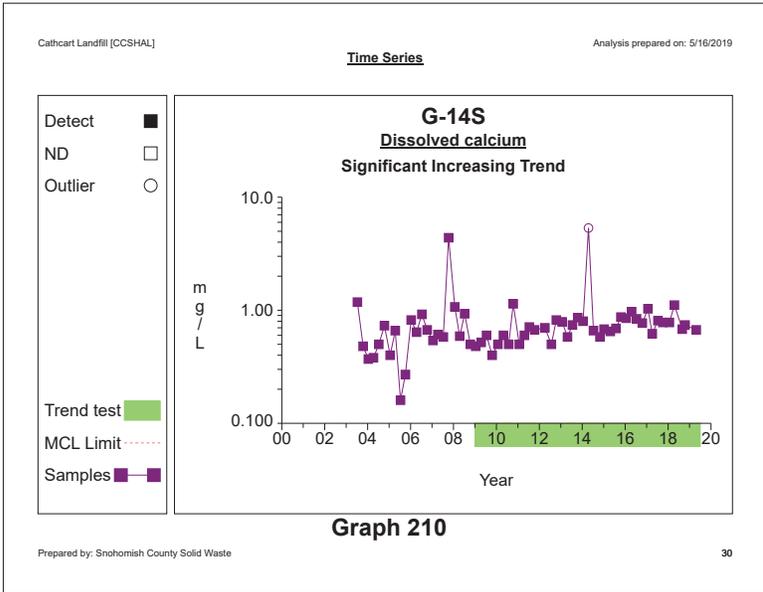


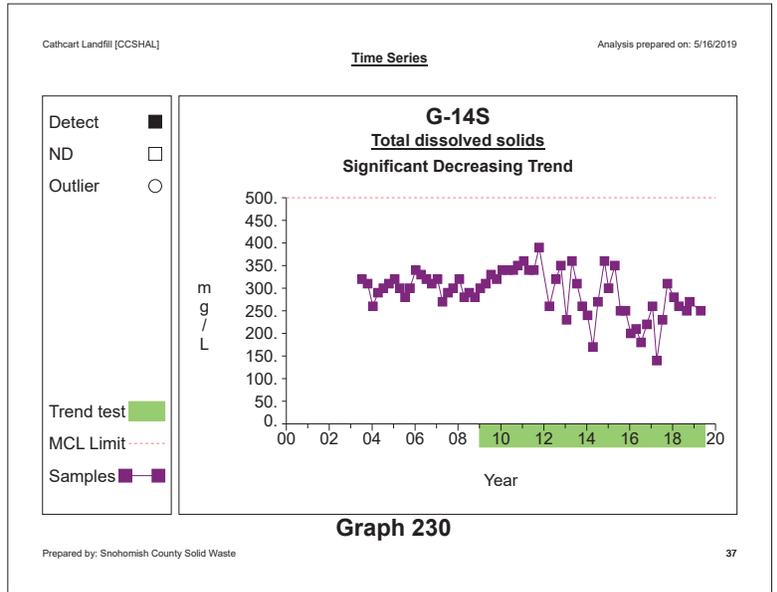
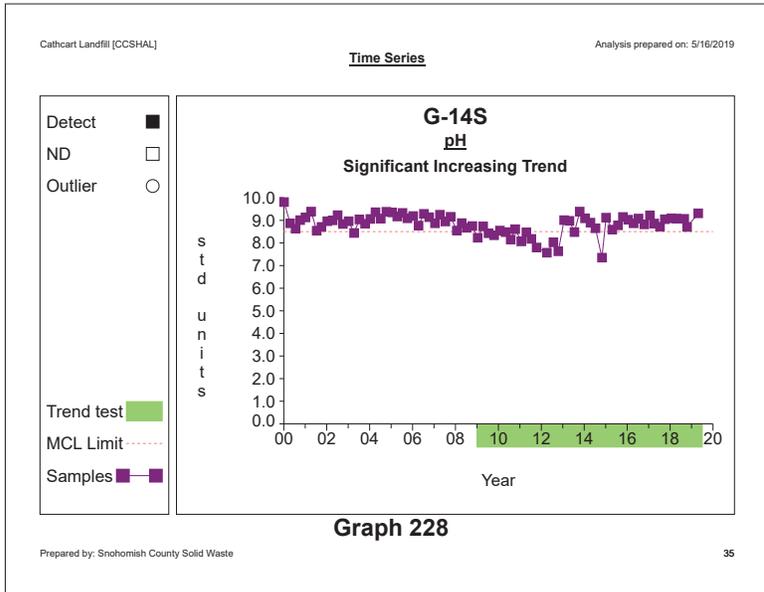
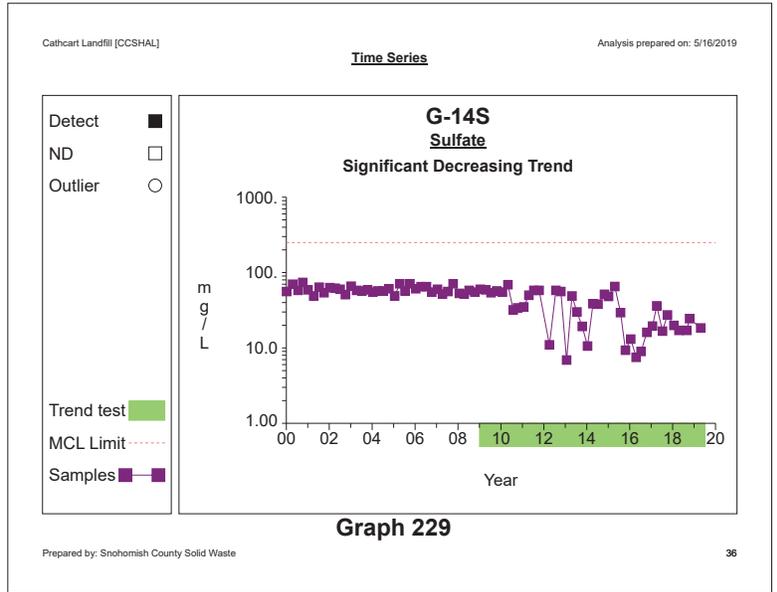
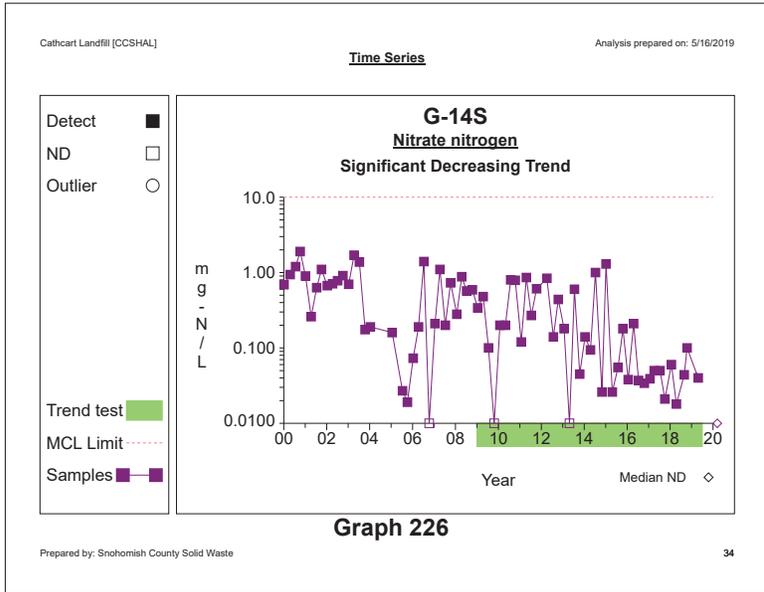
Graph 197

Time Series

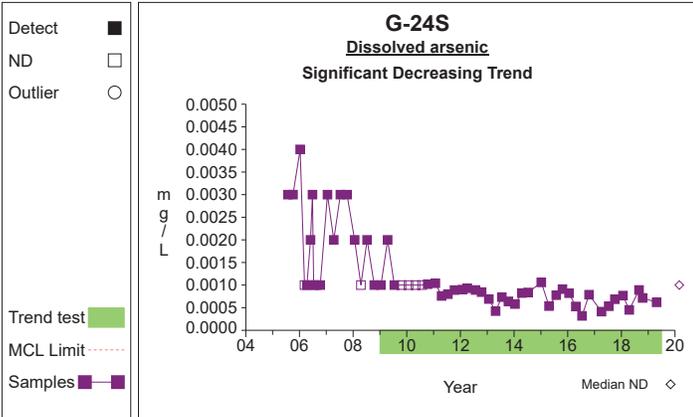


Graph 204





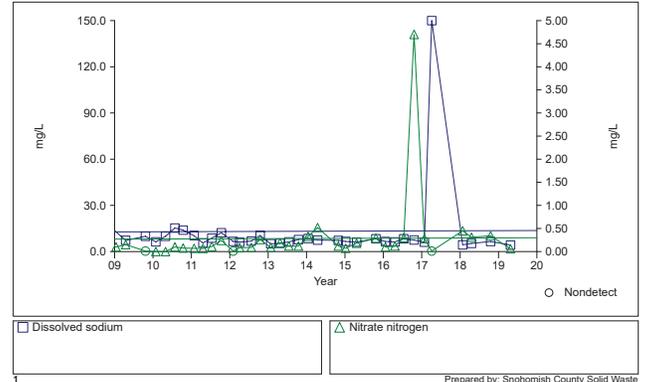
Time Series



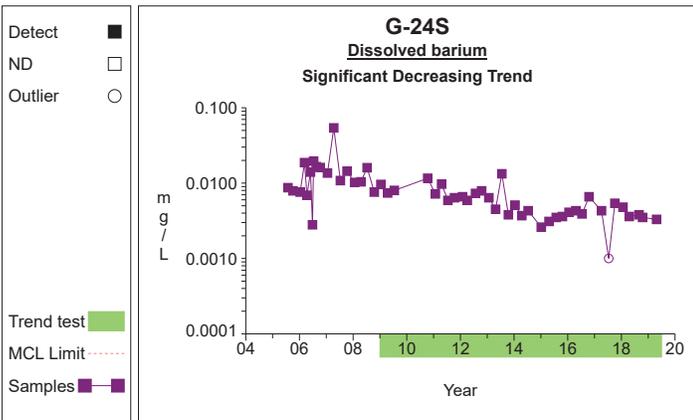
Graph 239

Cathcart Landfill

Time Series Plot for G-01A



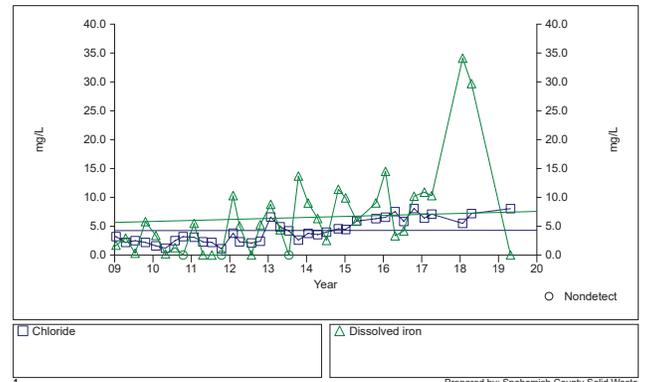
Time Series



Graph 240

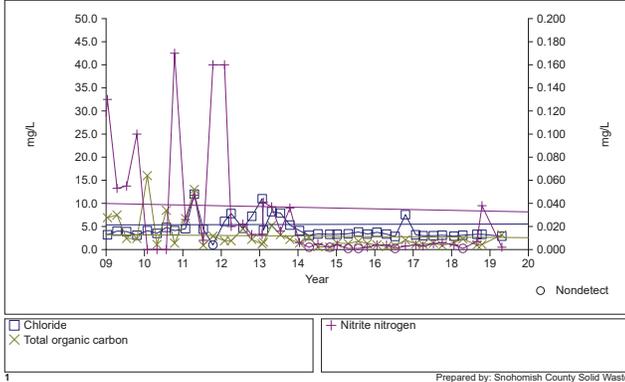
Cathcart Landfill

Time Series Plot for G-04A



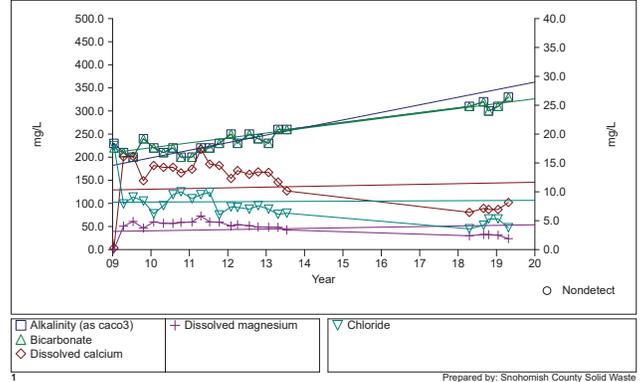
Cathcart Landfill

Time Series Plot for G-08D1



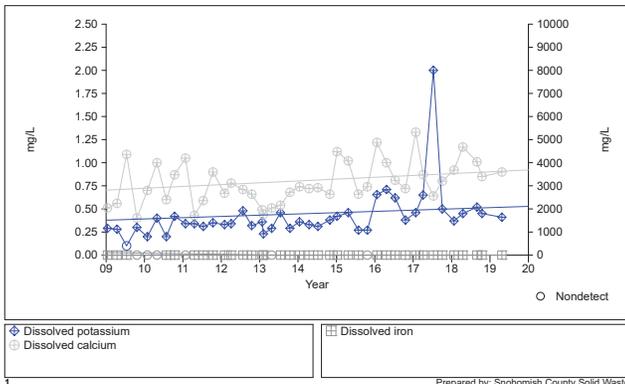
Cathcart Landfill

Time Series Plot for G-09S



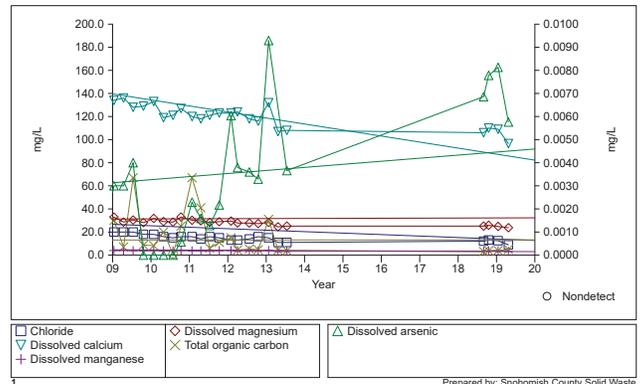
Cathcart Landfill

Time Series Plot for G-08D1



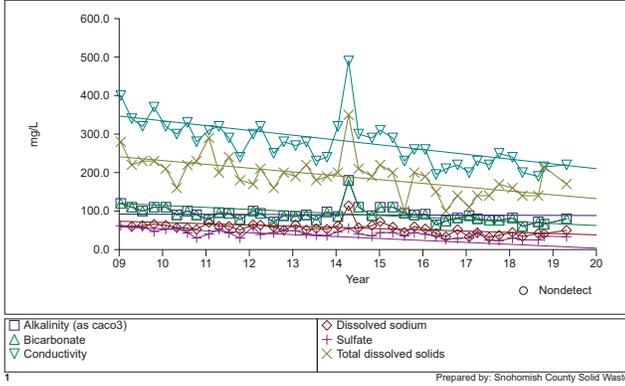
Cathcart Landfill

Time Series Plot for G-10S



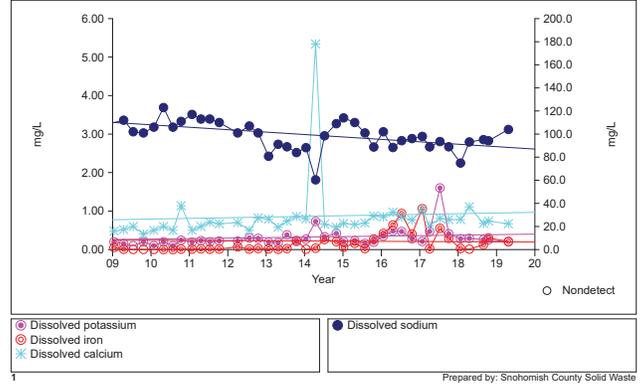
Cathcart Landfill

Time Series Plot for G-11S



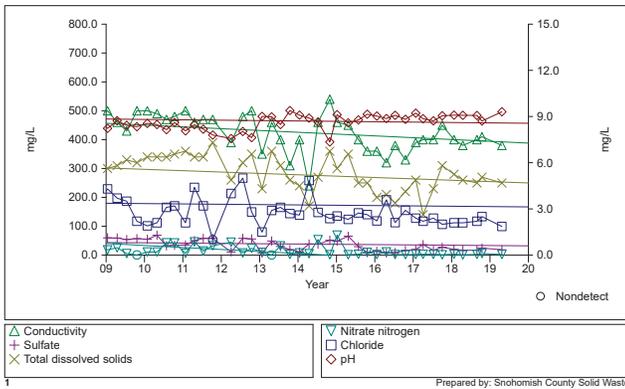
Cathcart Landfill

Time Series Plot for G-14S



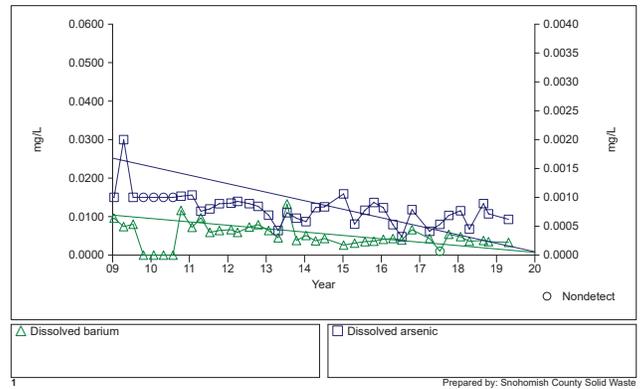
Cathcart Landfill

Time Series Plot for G-14S

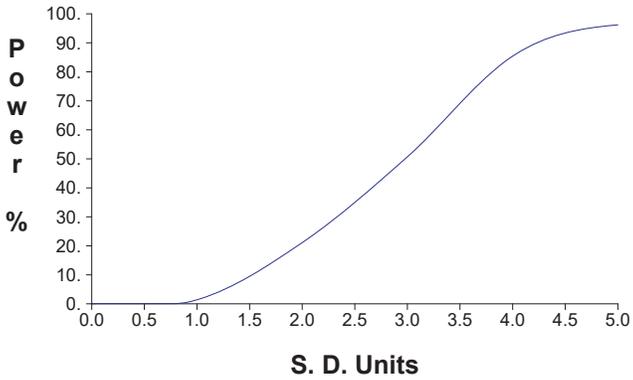


Cathcart Landfill

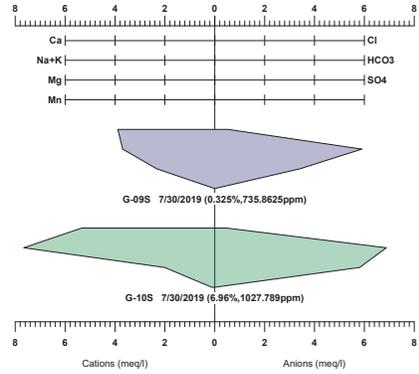
Time Series Plot for G-24S



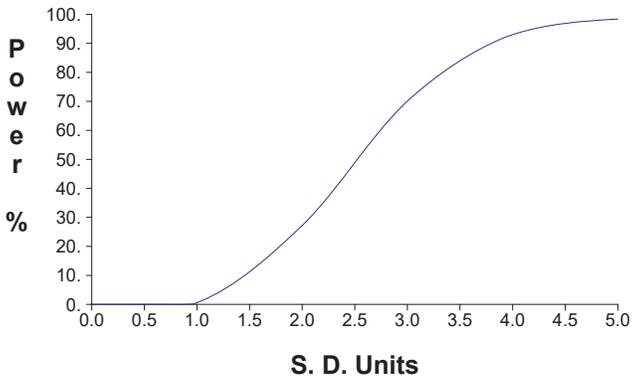
False Positive and False Negative Rates for Current Intra-Well Prediction Limits Monitoring Program



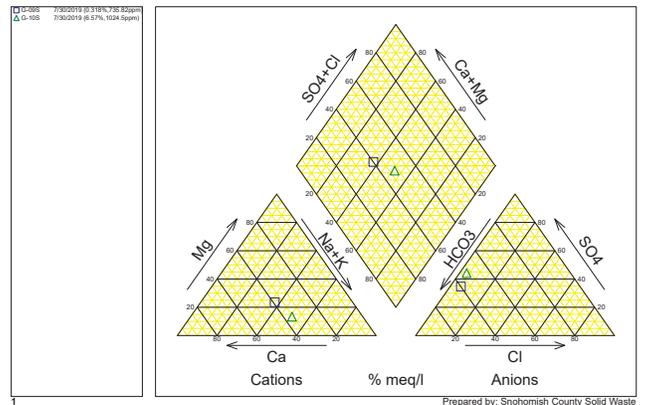
Cathcart Landfill



False Positive and False Negative Rates for Current Upgradient vs. Downgradient Monitoring Program



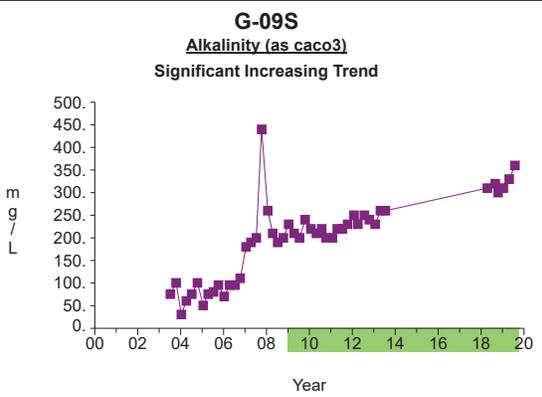
Cathcart Landfill



Time Series

- Detect
- ND
- Outlier

- Trend test
- MCL Limit
- Samples

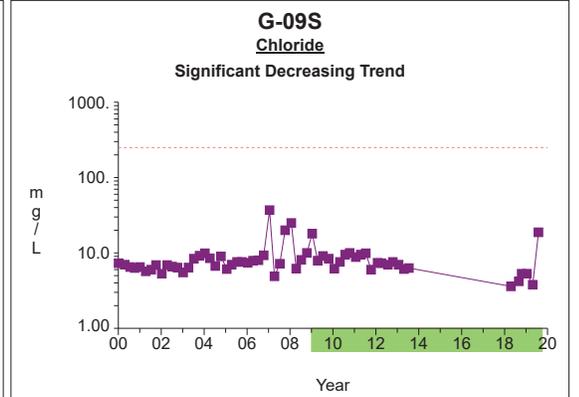


Graph 100

Time Series

- Detect
- ND
- Outlier

- Trend test
- MCL Limit
- Samples

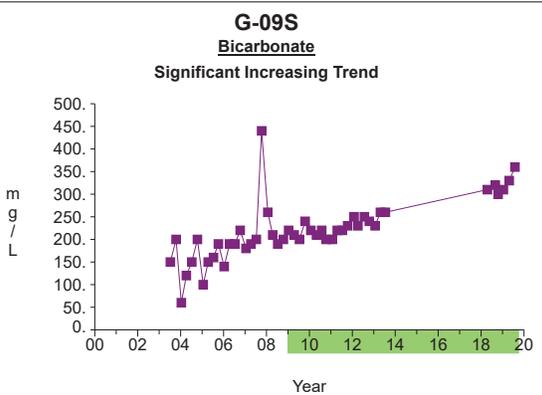


Graph 104

Time Series

- Detect
- ND
- Outlier

- Trend test
- MCL Limit
- Samples

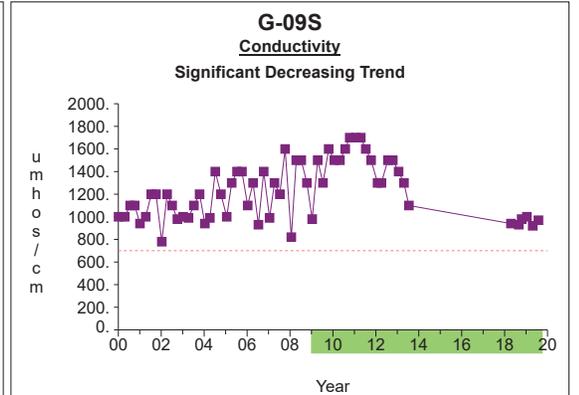


Graph 102

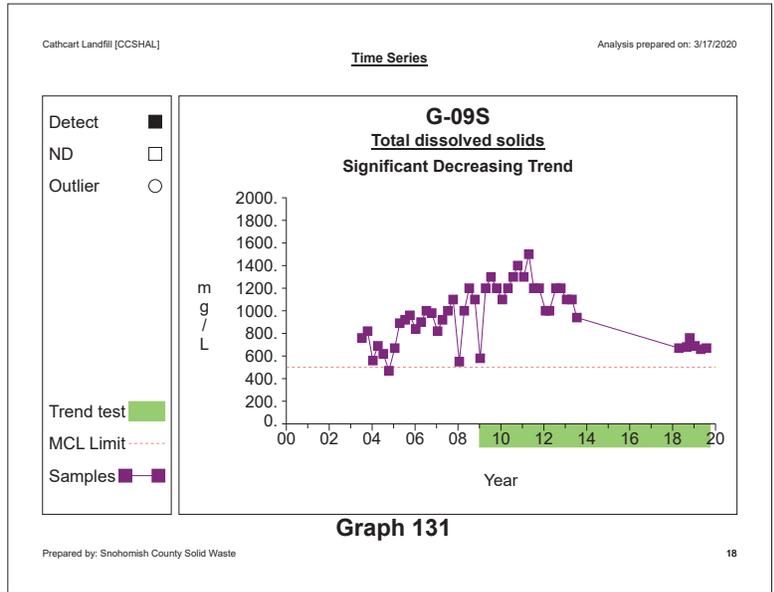
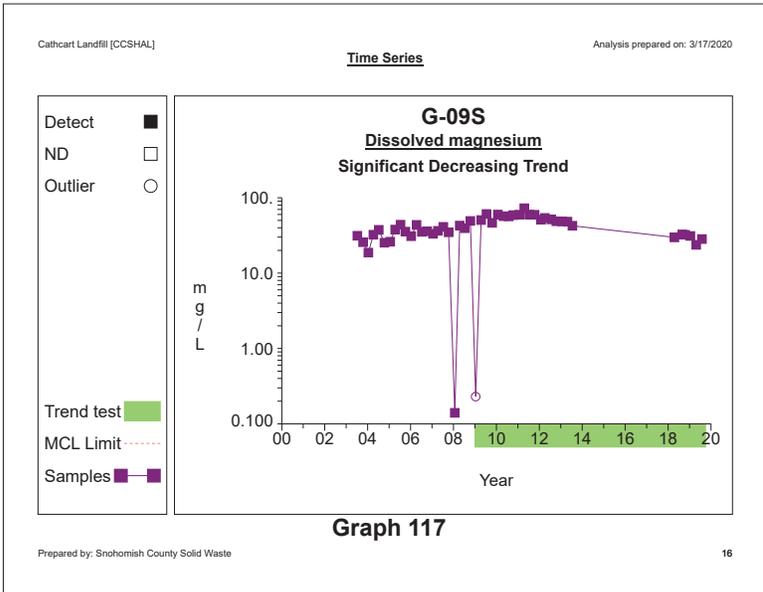
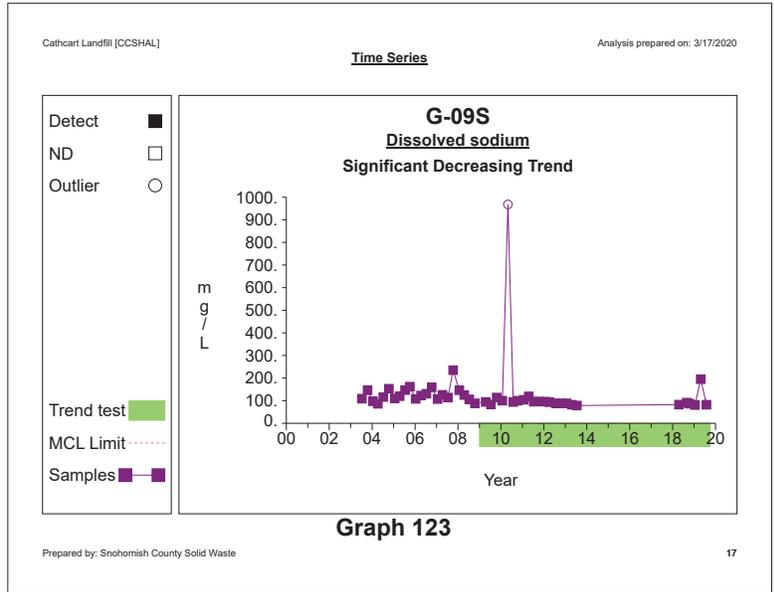
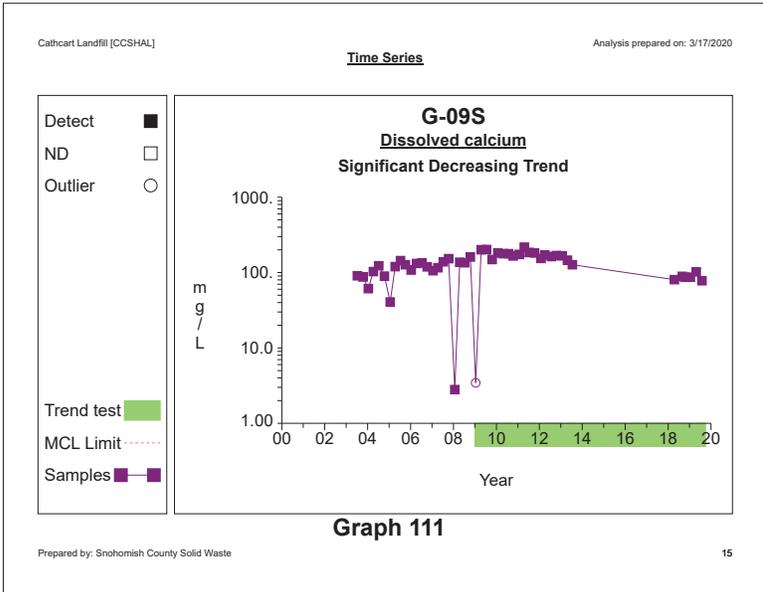
Time Series

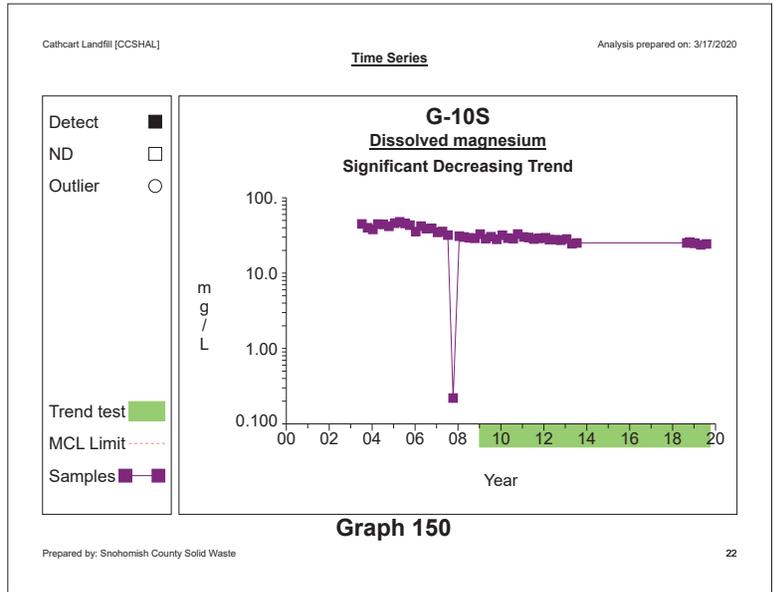
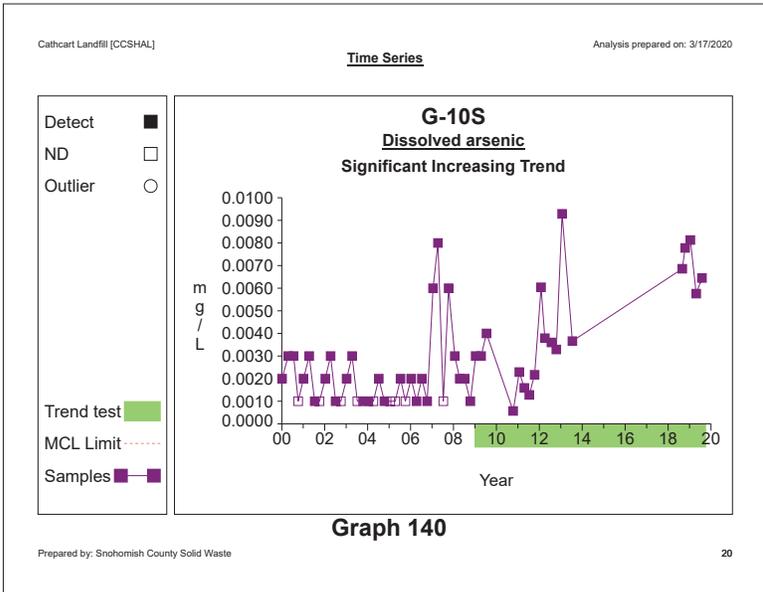
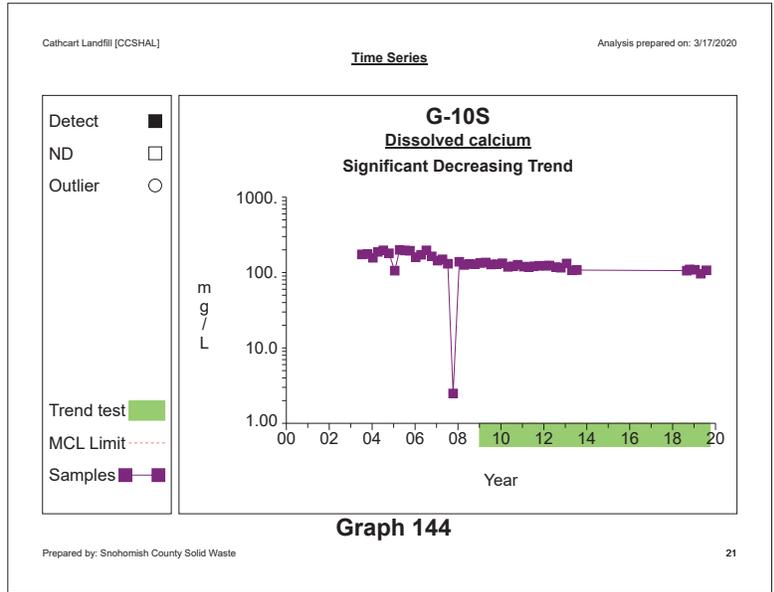
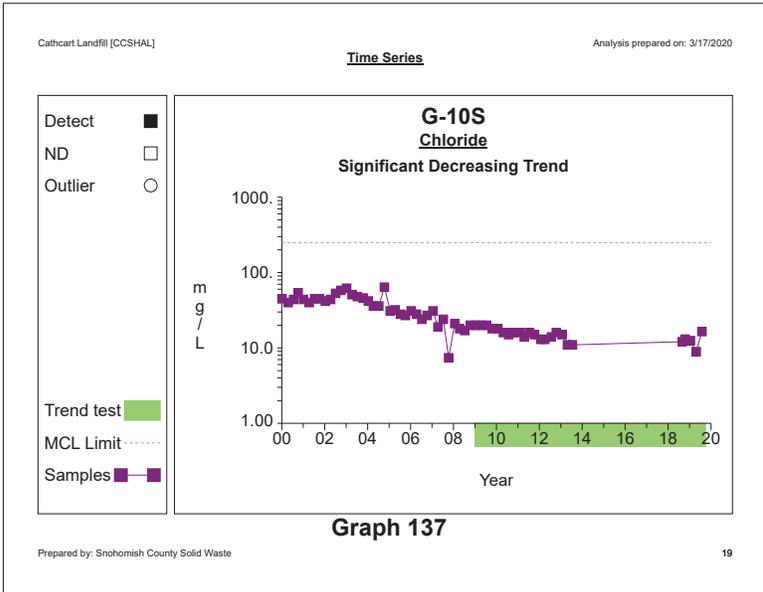
- Detect
- ND
- Outlier

- Trend test
- MCL Limit
- Samples



Graph 105

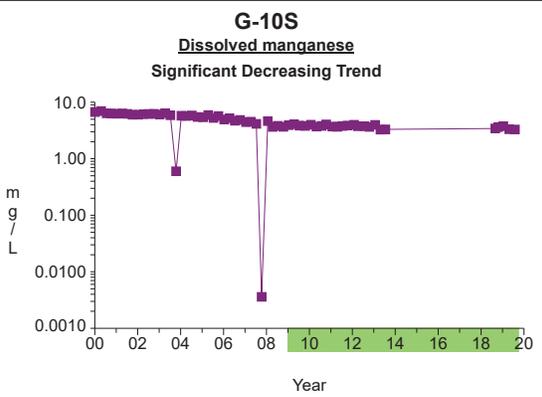




Time Series

- Detect
- ND
- Outlier

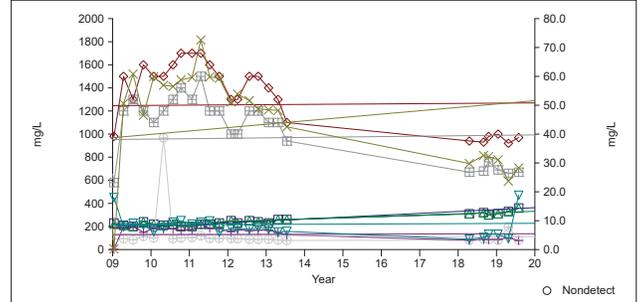
- Trend test
- MCL Limit
- Samples



Graph 151

Cathcart Landfill

Time Series Plot for G-09S

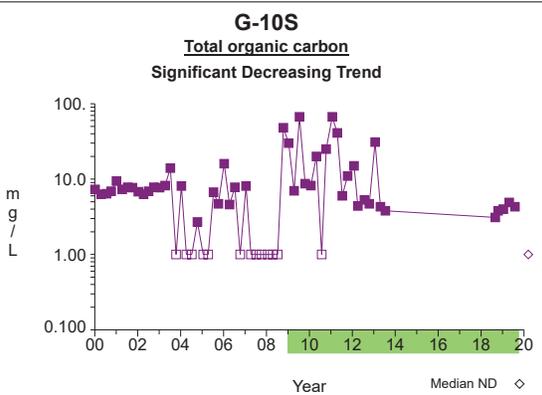


- Alkalinity (as cacO3)
- Bicarbonate
- Chloride
- Conductivity
- Dissolved calcium
- Dissolved magnesium
- Dissolved sodium
- Total dissolved solids

Time Series

- Detect
- ND
- Outlier

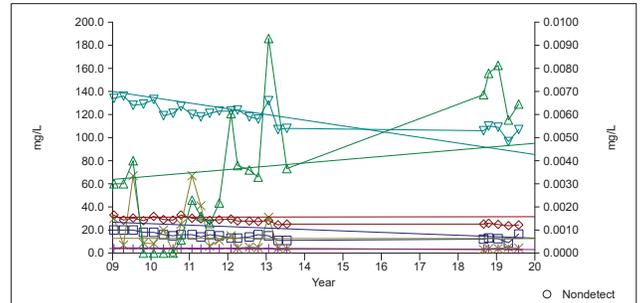
- Trend test
- MCL Limit
- Samples



Graph 165

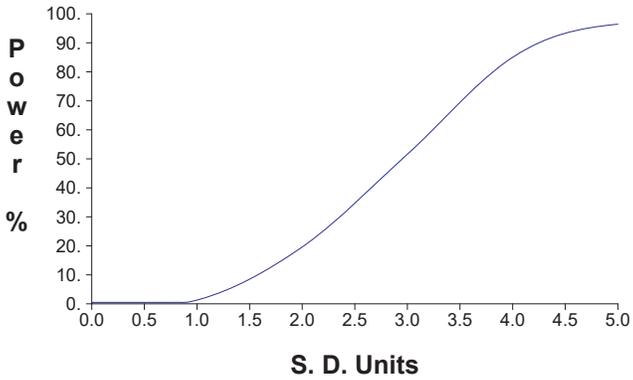
Cathcart Landfill

Time Series Plot for G-10S

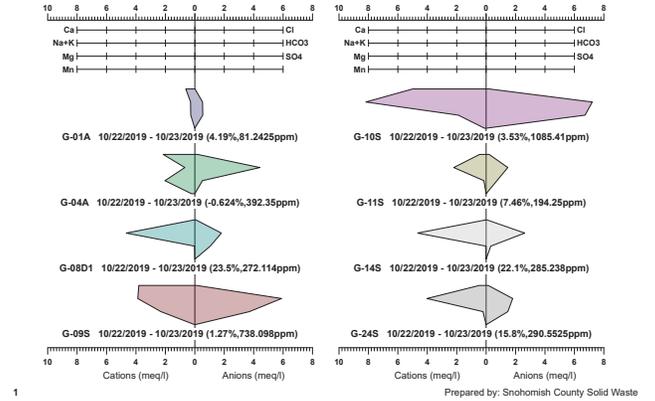


- Chloride
- Dissolved calcium
- Dissolved manganese
- Dissolved magnesium
- Total organic carbon

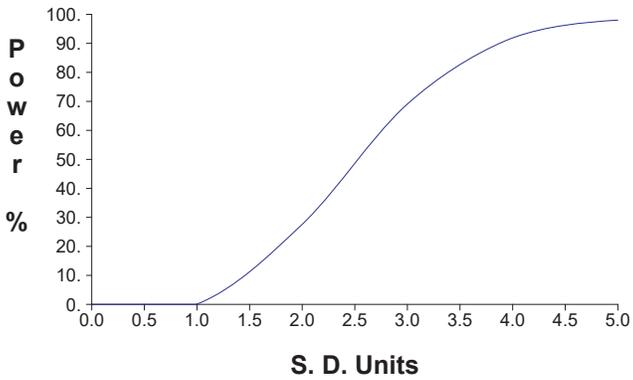
False Positive and False Negative Rates for Current Intra-Well Prediction Limits Monitoring Program



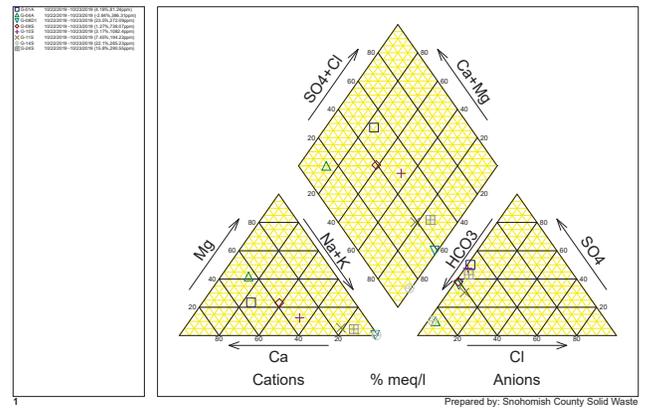
Cathcart Landfill

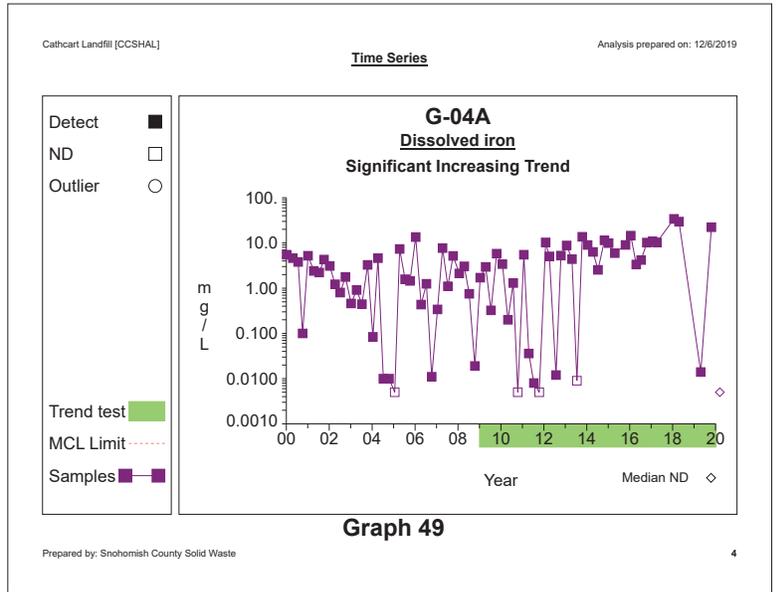
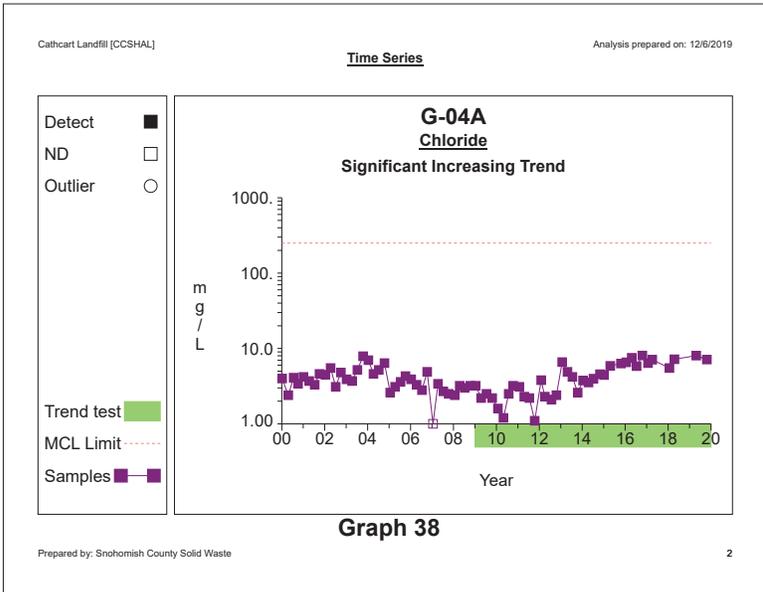
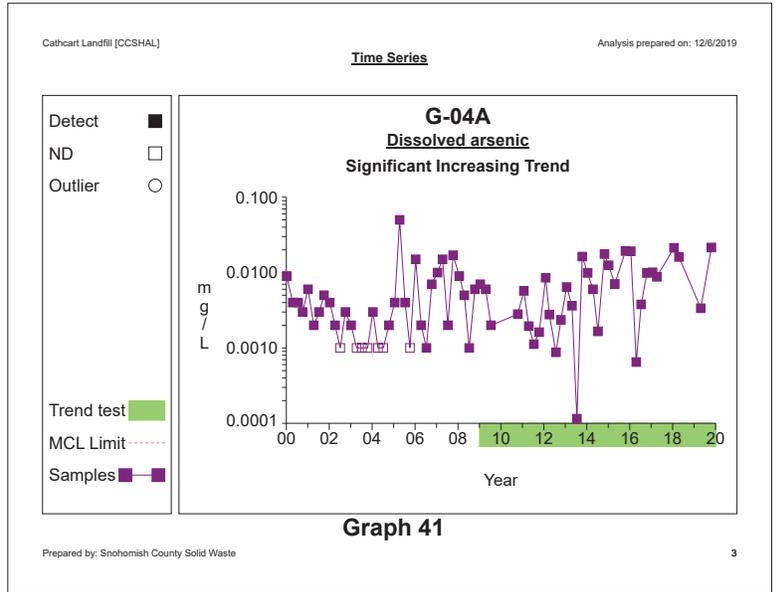
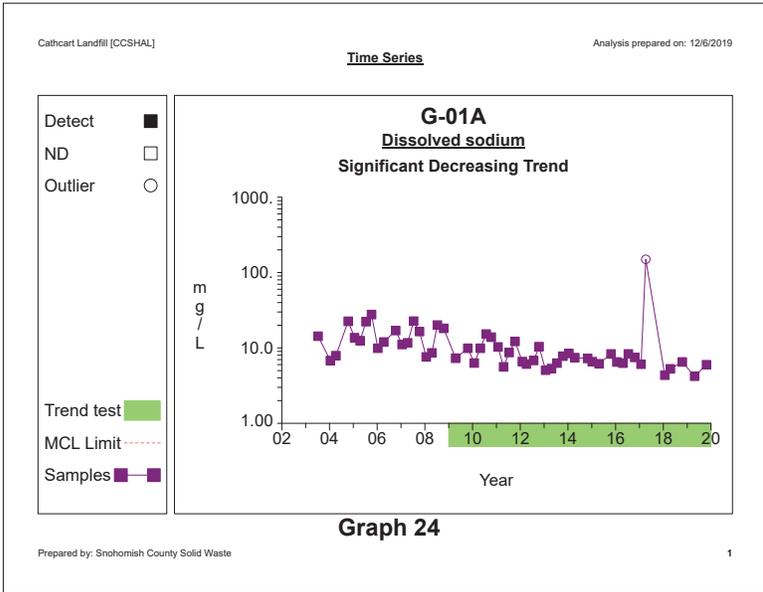


False Positive and False Negative Rates for Current Upgradient vs. Downgradient Monitoring Program

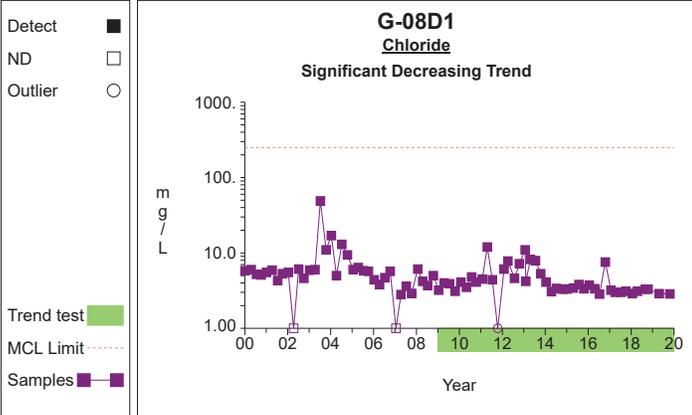


Cathcart Landfill



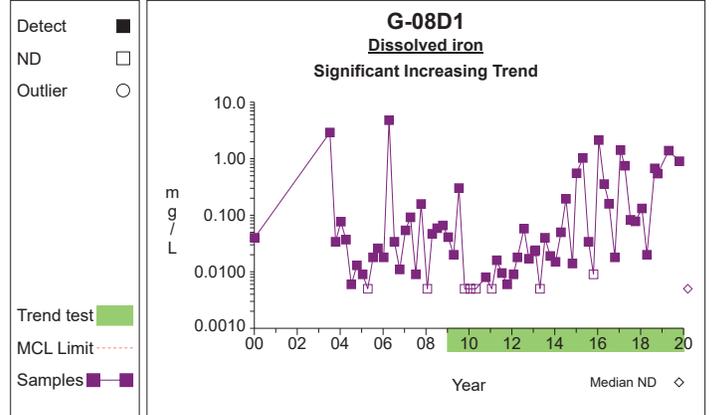


Time Series



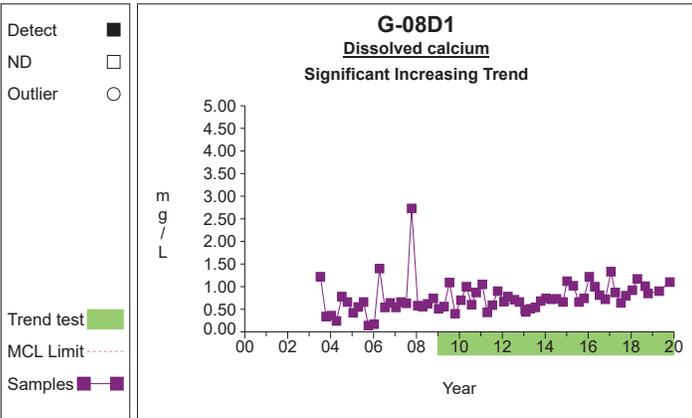
Graph 71

Time Series



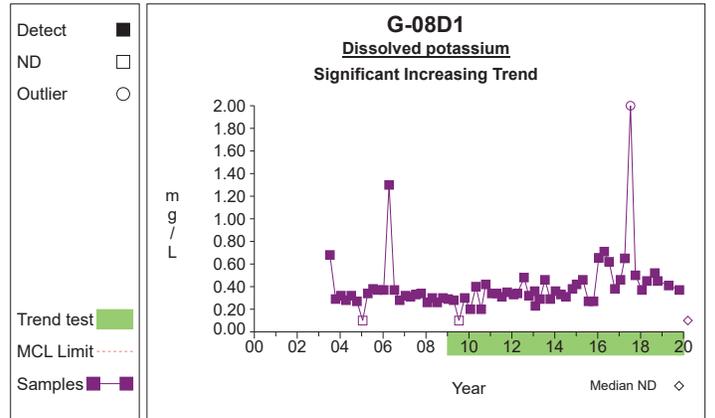
Graph 82

Time Series

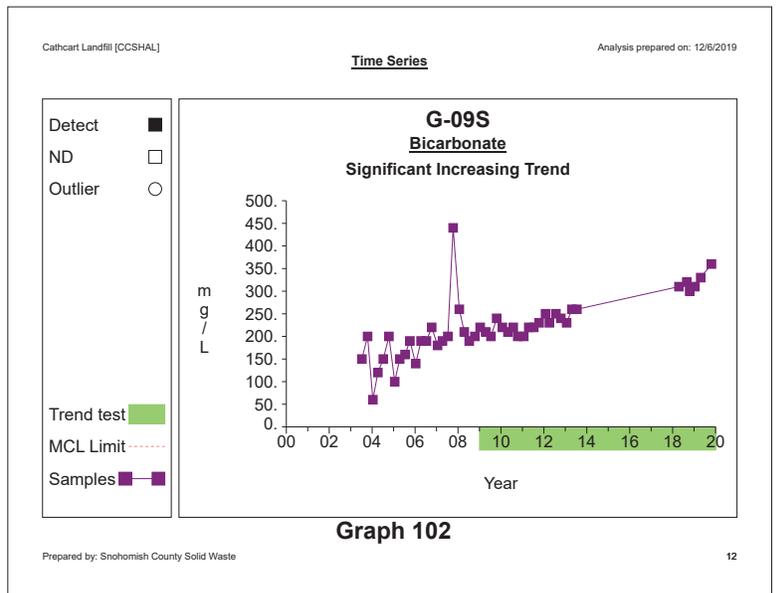
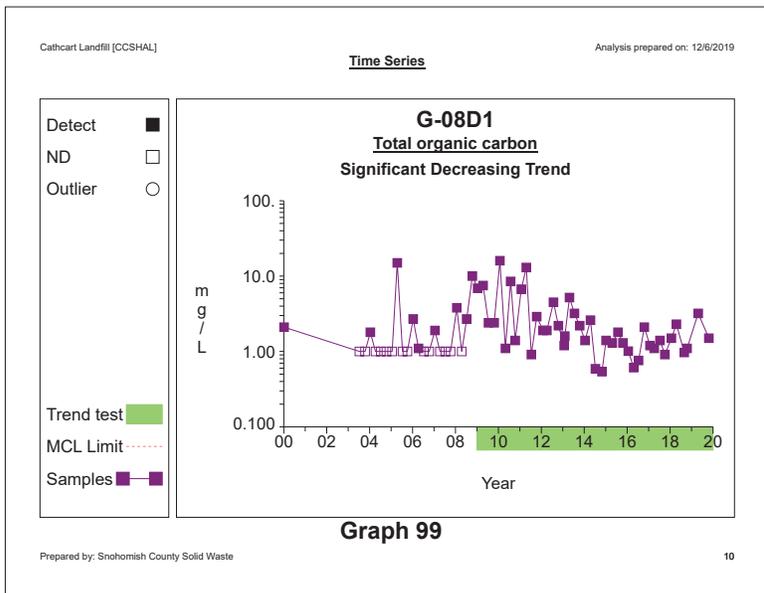
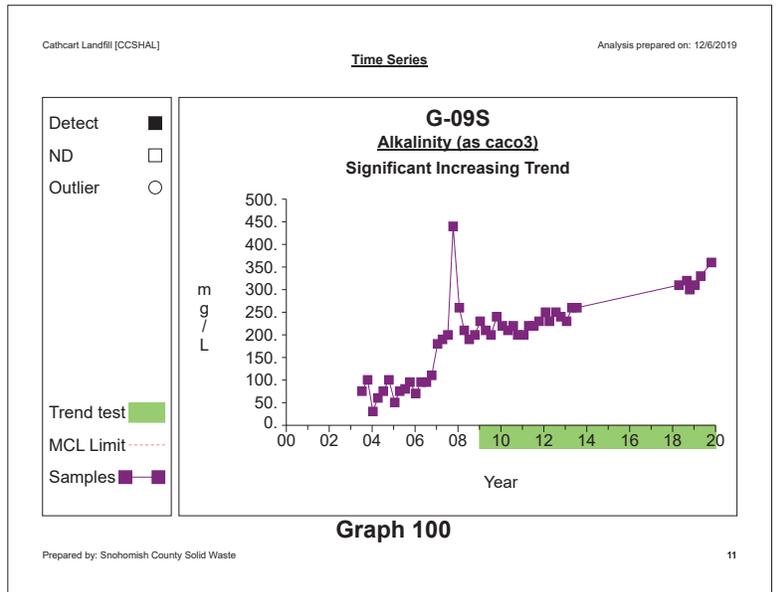
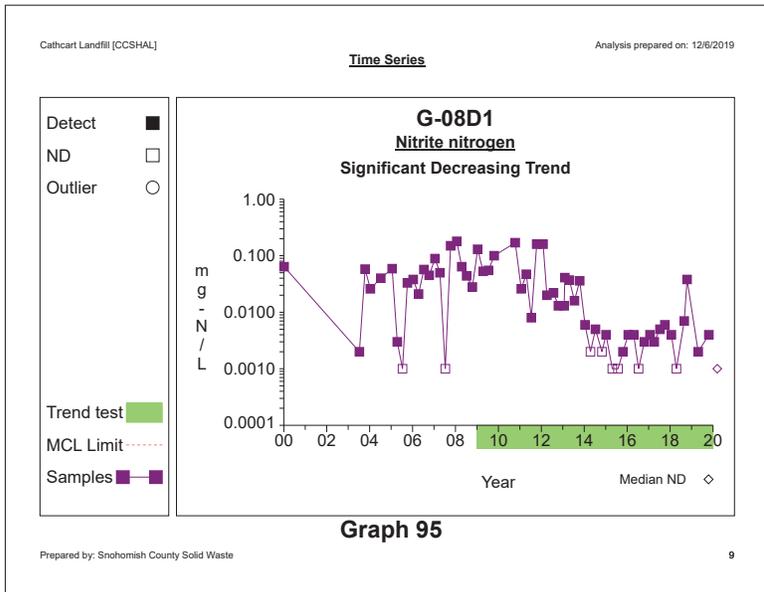


Graph 78

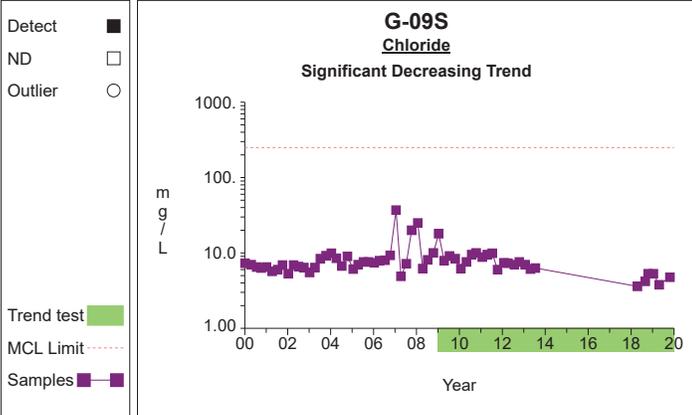
Time Series



Graph 87

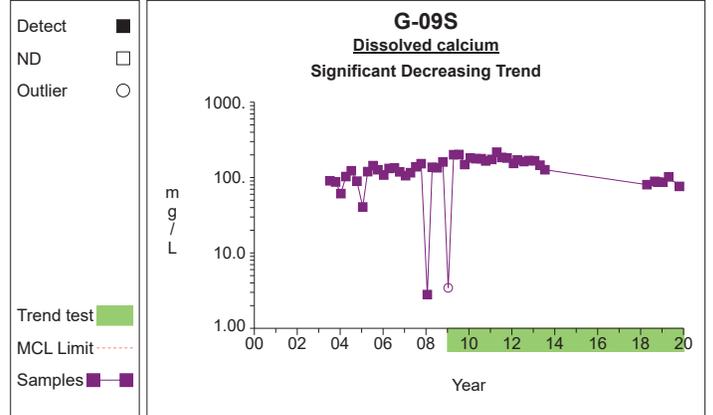


Time Series



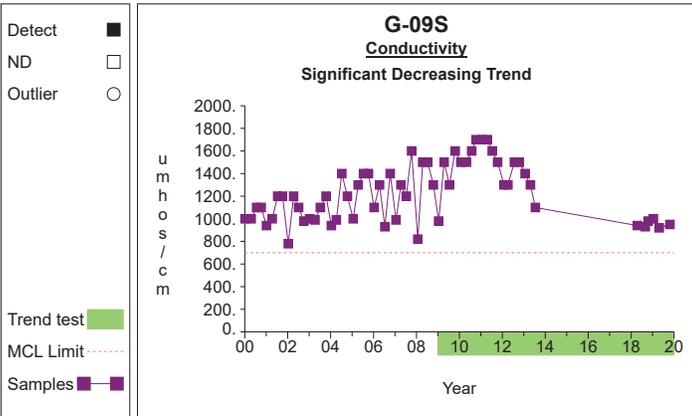
Graph 104

Time Series



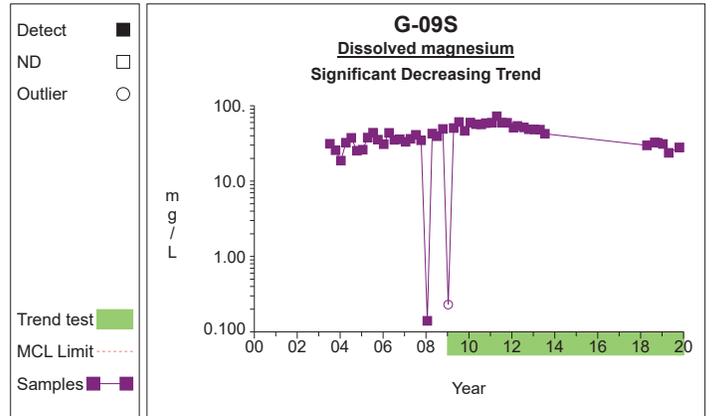
Graph 111

Time Series



Graph 105

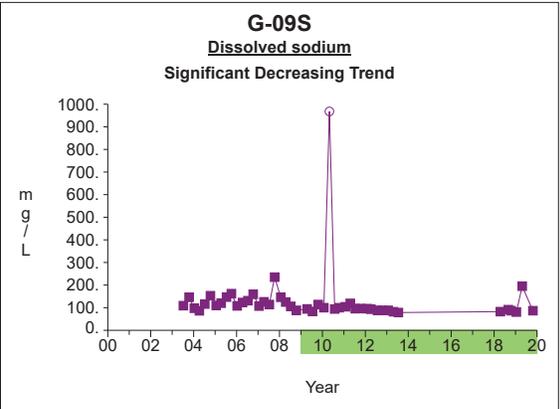
Time Series



Graph 117

Time Series

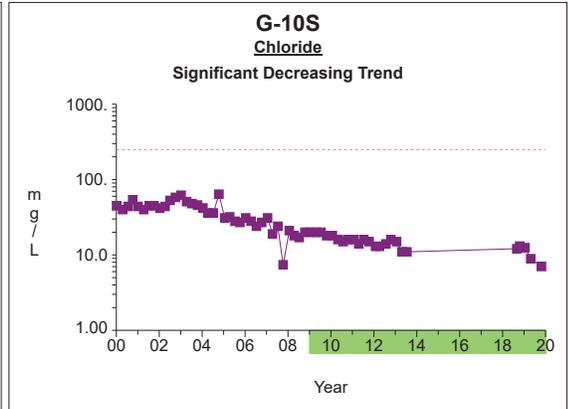
- Detect
 - ND
 - Outlier
-
- Trend test
 - MCL Limit
 - Samples



Graph 123

Time Series

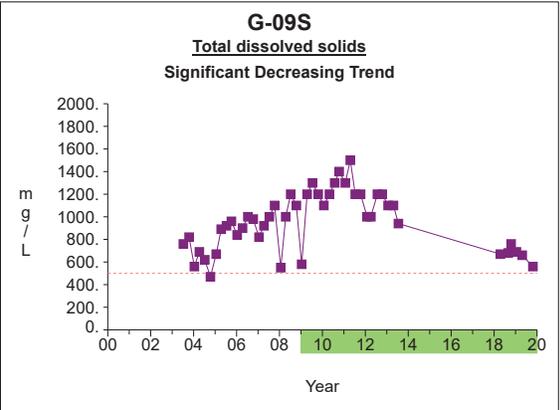
- Detect
 - ND
 - Outlier
-
- Trend test
 - MCL Limit
 - Samples



Graph 137

Time Series

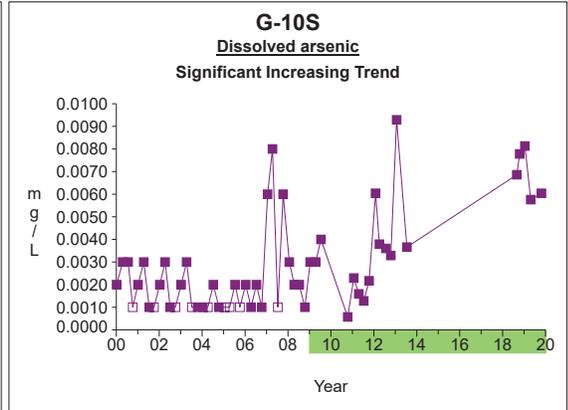
- Detect
 - ND
 - Outlier
-
- Trend test
 - MCL Limit
 - Samples



Graph 131

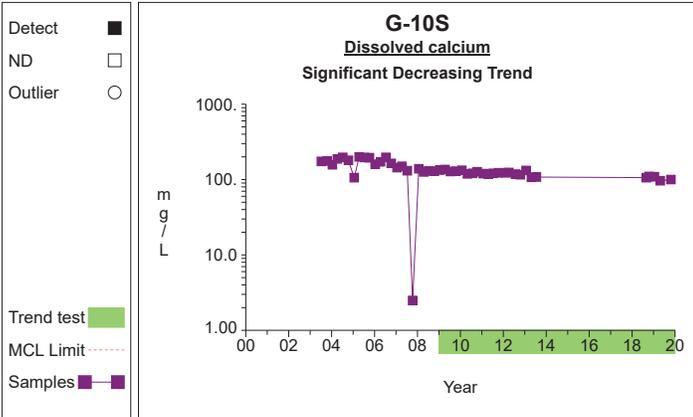
Time Series

- Detect
 - ND
 - Outlier
-
- Trend test
 - MCL Limit
 - Samples



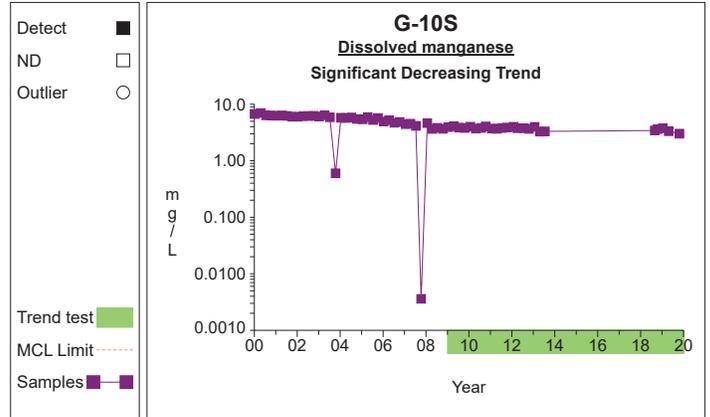
Graph 140

Time Series



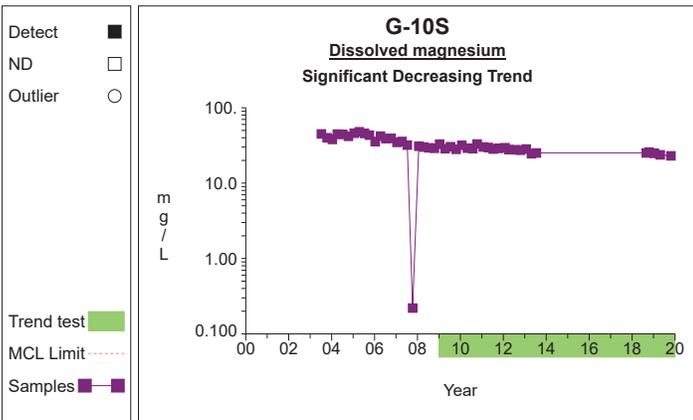
Graph 144

Time Series



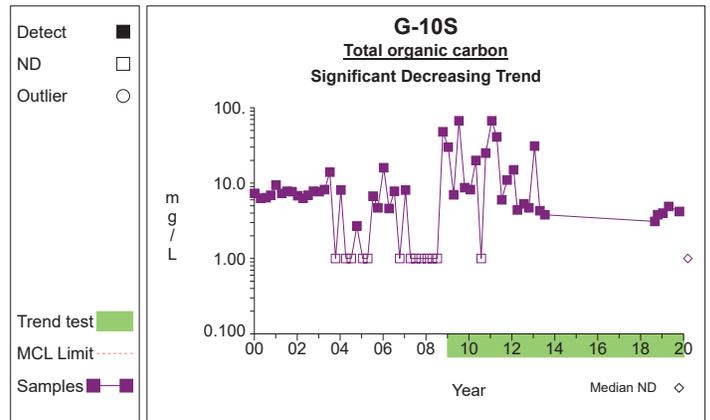
Graph 151

Time Series



Graph 150

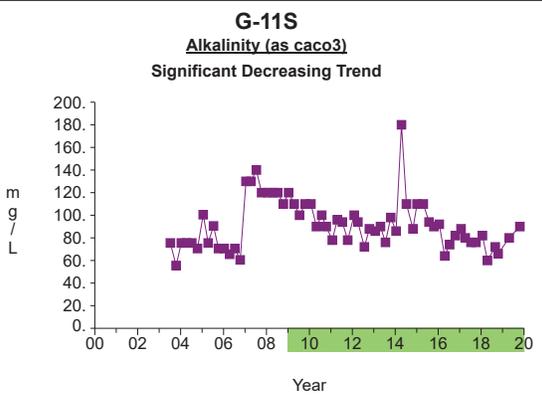
Time Series



Graph 165

Time Series

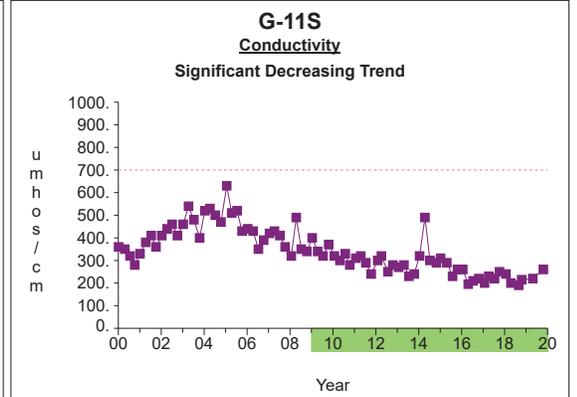
- Detect
- ND
- Outlier



Graph 166

Time Series

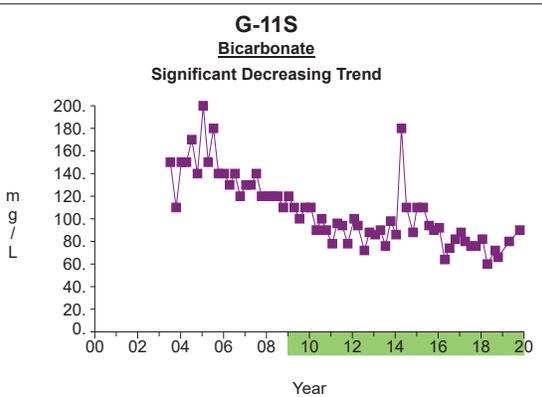
- Detect
- ND
- Outlier



Graph 171

Time Series

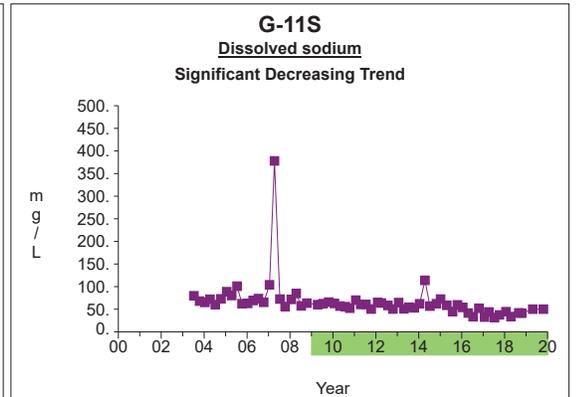
- Detect
- ND
- Outlier



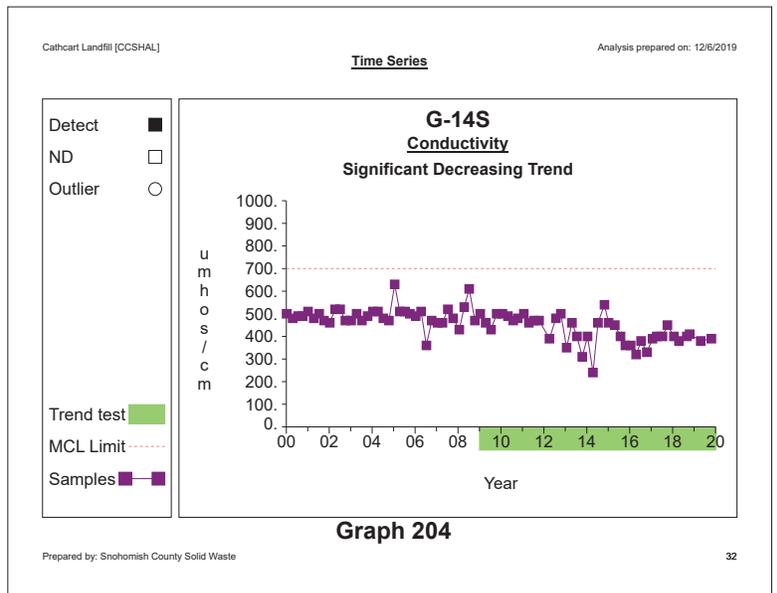
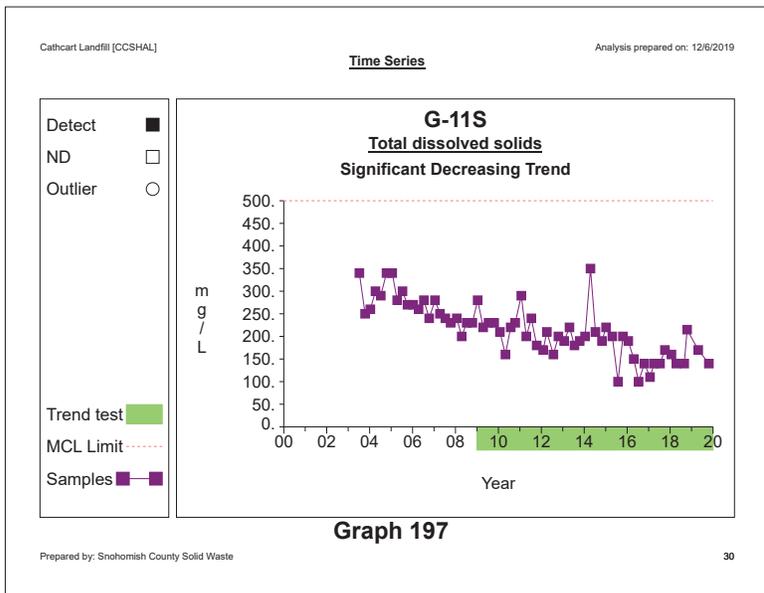
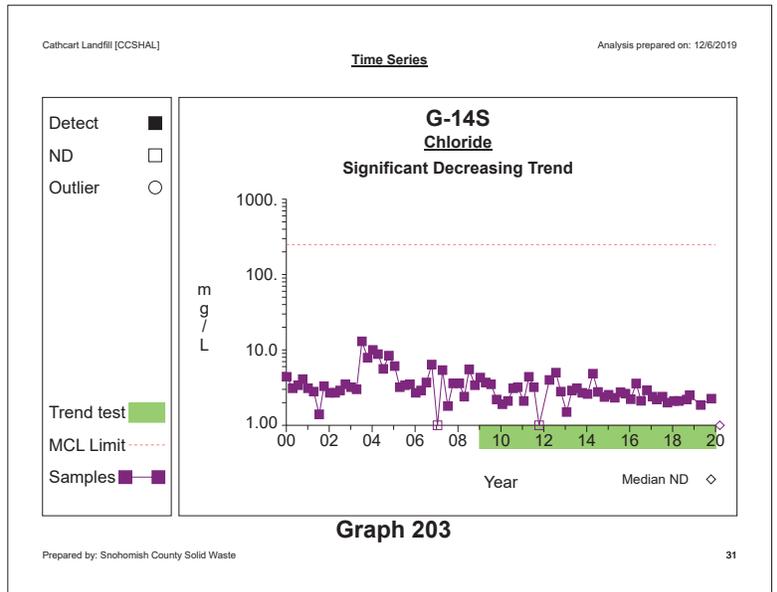
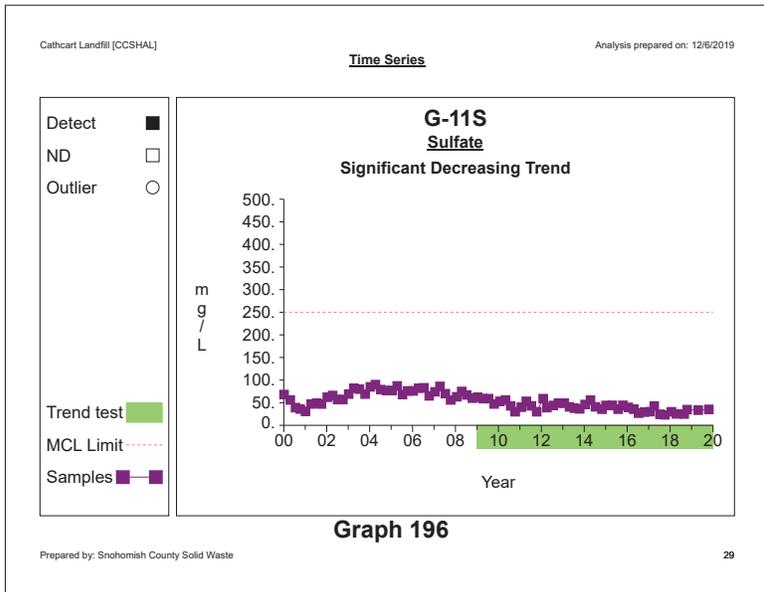
Graph 168

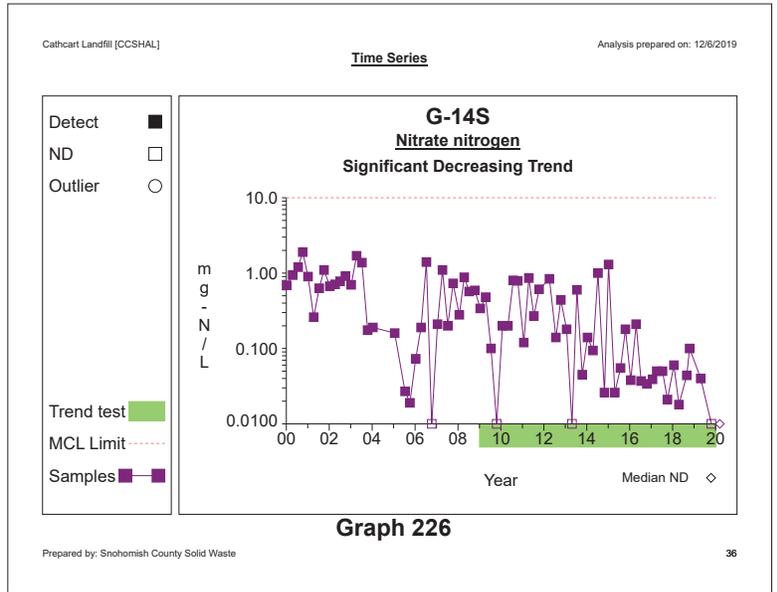
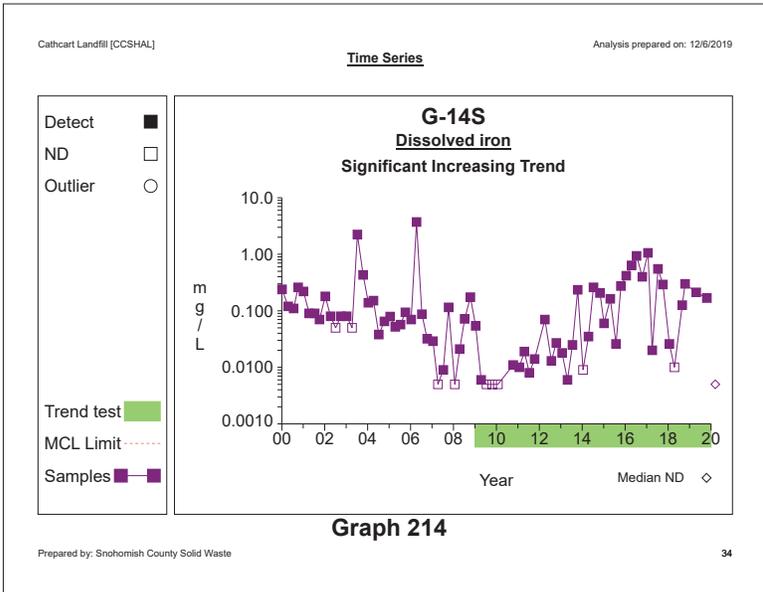
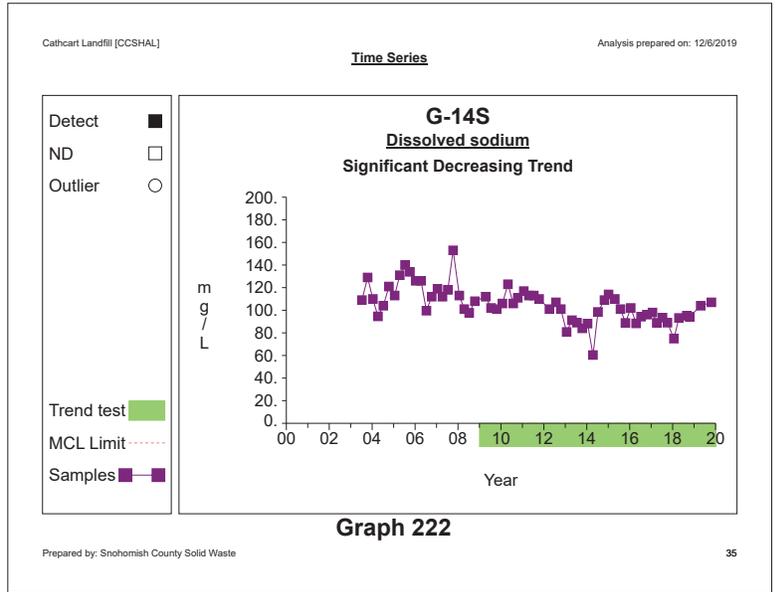
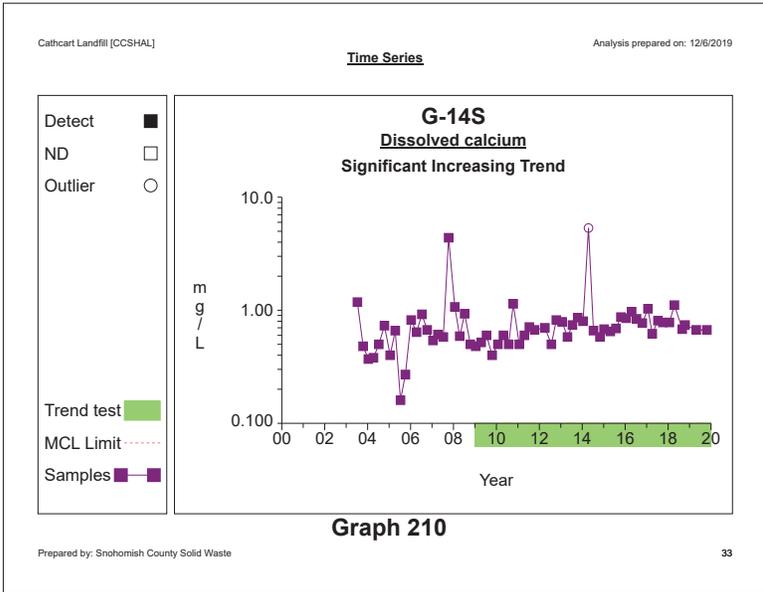
Time Series

- Detect
- ND
- Outlier

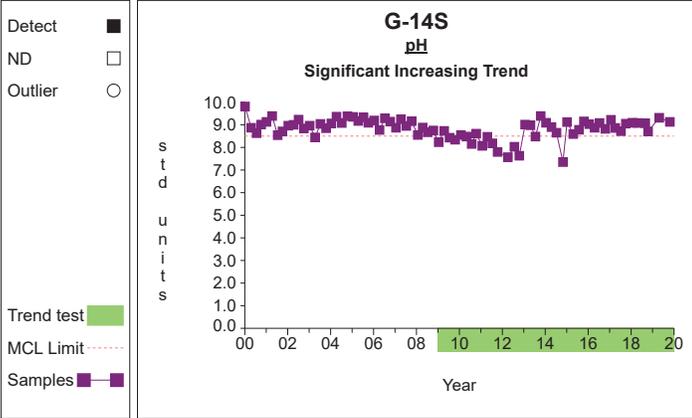


Graph 189



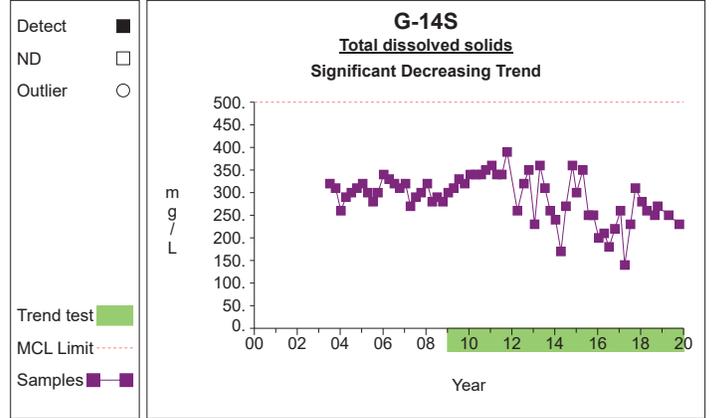


Time Series



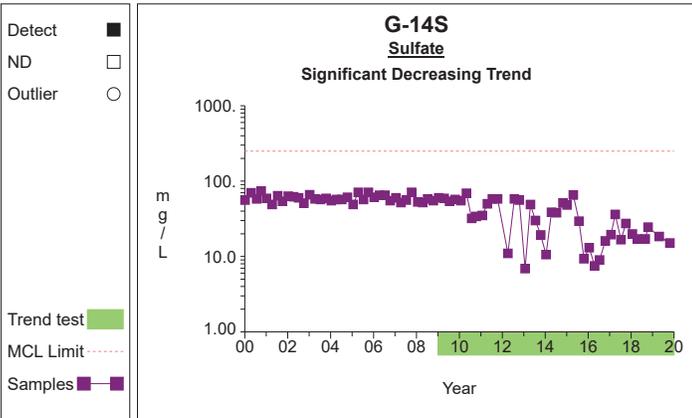
Graph 228

Time Series



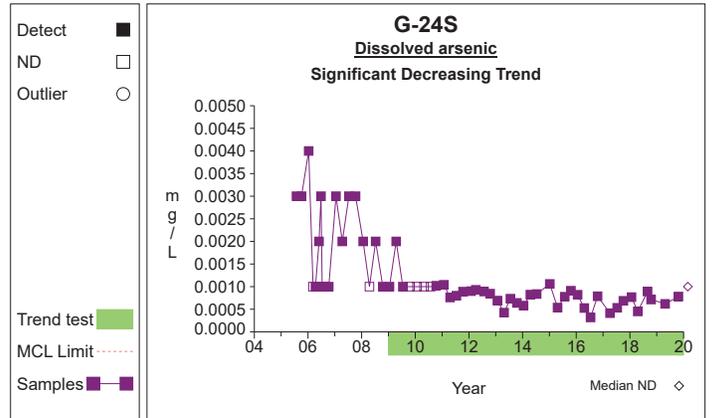
Graph 230

Time Series



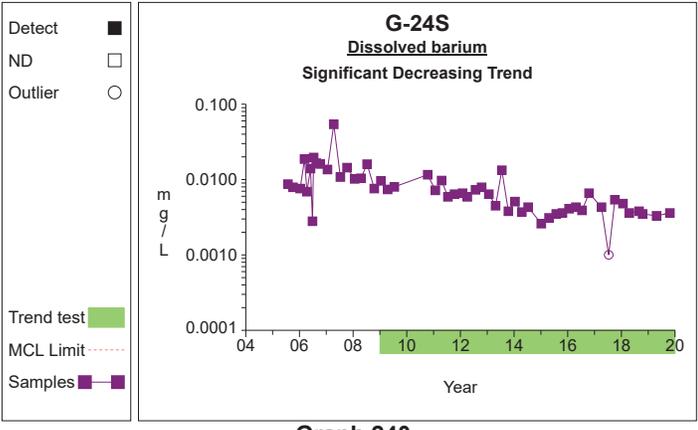
Graph 229

Time Series



Graph 239

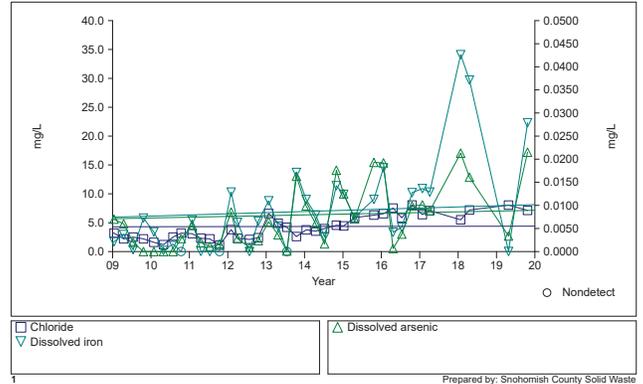
Time Series



Graph 240

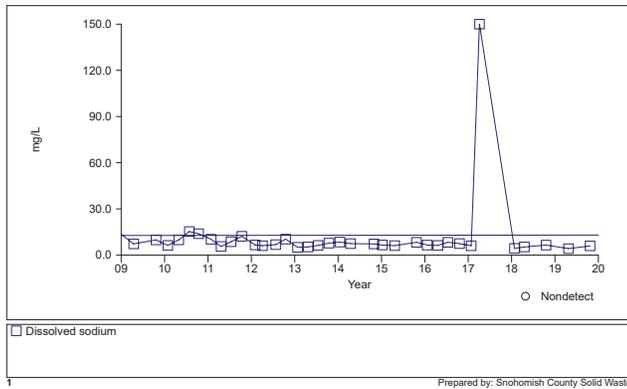
Cathcart Landfill

Time Series Plot for G-04A



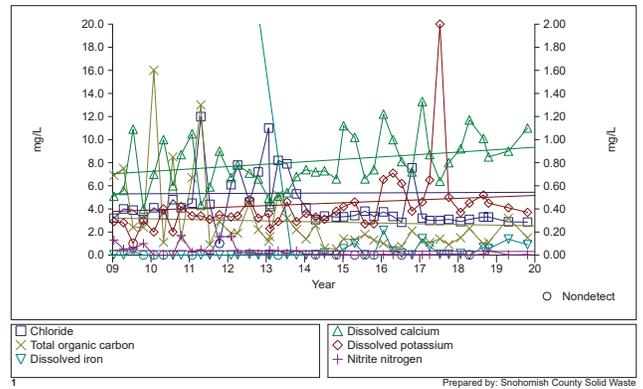
Cathcart Landfill

Time Series Plot for G-01A



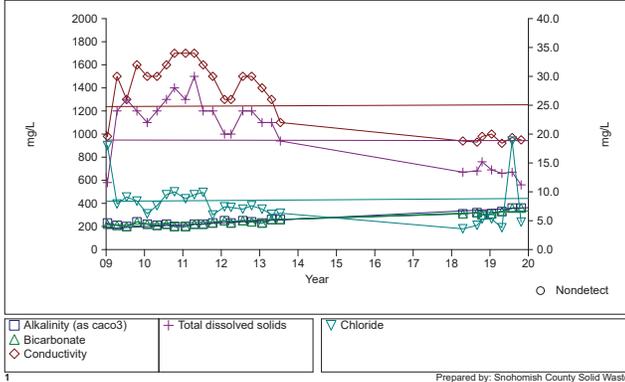
Cathcart Landfill

Time Series Plot for G-08D1



Cathcart Landfill

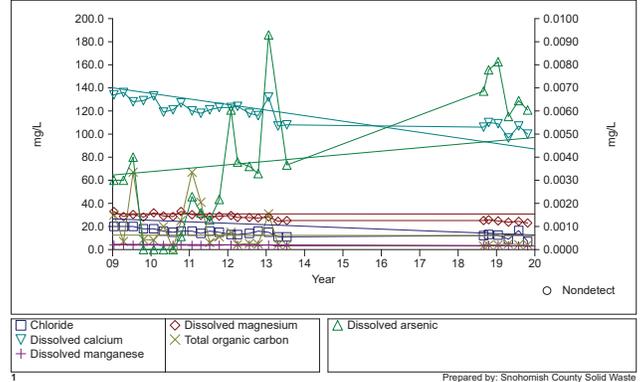
Time Series Plot for G-09S



Prepared by: Snohomish County Solid Waste

Cathcart Landfill

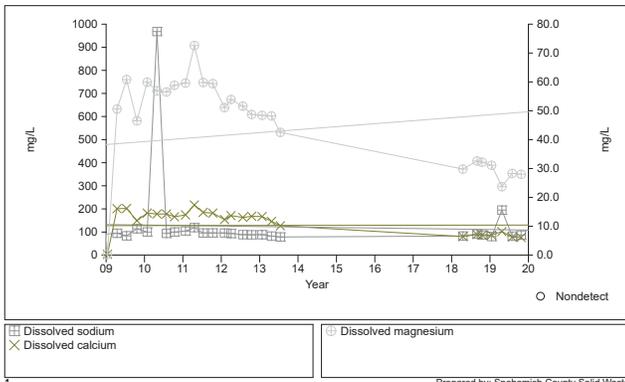
Time Series Plot for G-10S



Prepared by: Snohomish County Solid Waste

Cathcart Landfill

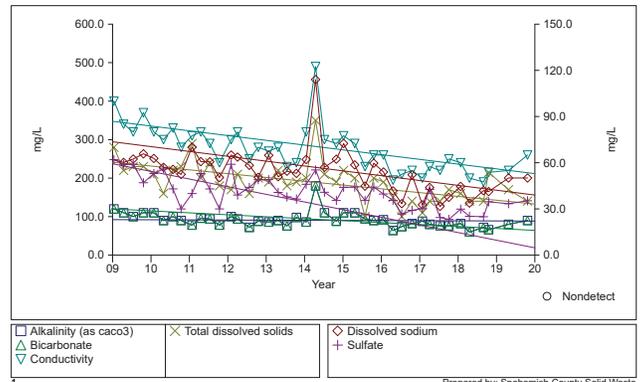
Time Series Plot for G-09S



Prepared by: Snohomish County Solid Waste

Cathcart Landfill

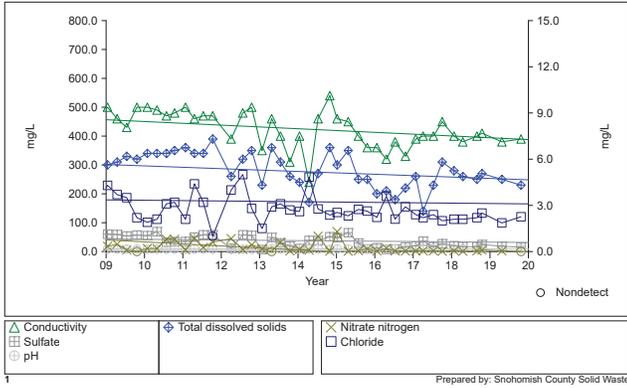
Time Series Plot for G-11S



Prepared by: Snohomish County Solid Waste

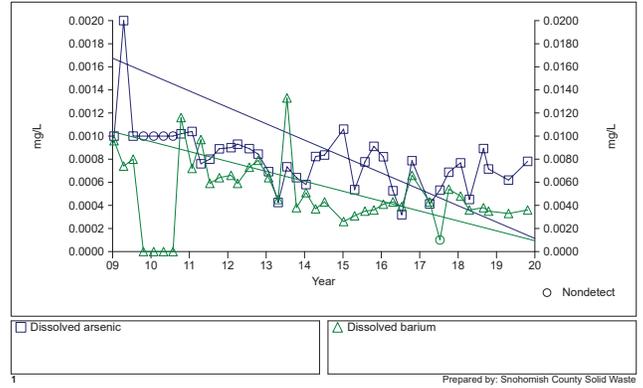
Cathcart Landfill

Time Series Plot for G-14S



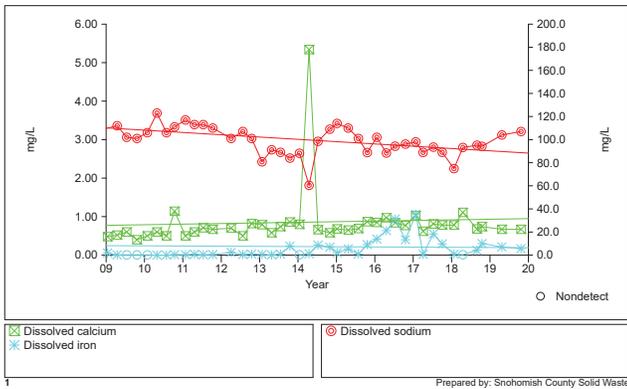
Cathcart Landfill

Time Series Plot for G-24S



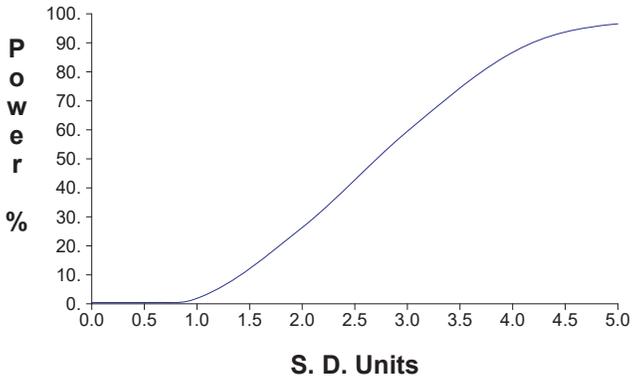
Cathcart Landfill

Time Series Plot for G-14S

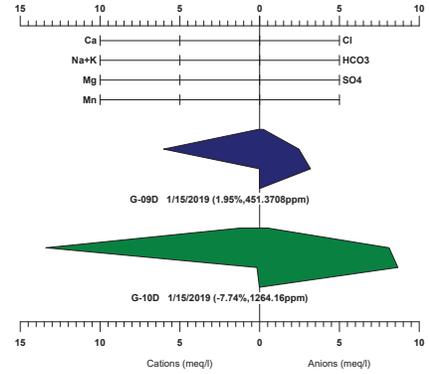


Deep Wells

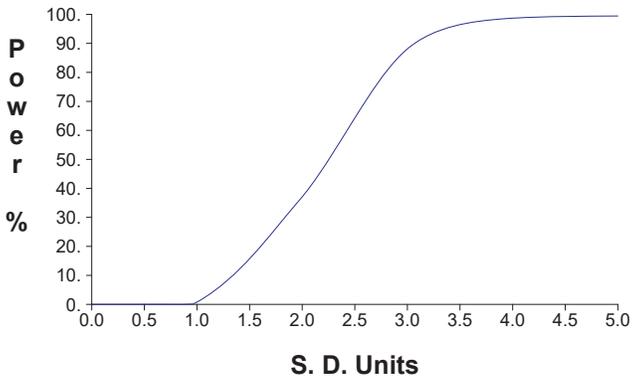
False Positive and False Negative Rates for Current Intra-Well Prediction Limits Monitoring Program



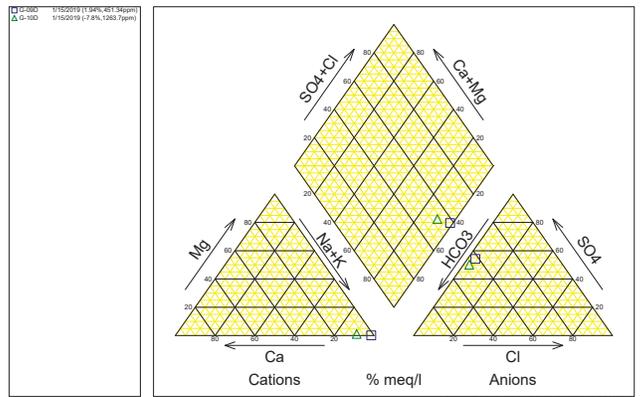
Cathcart Landfill



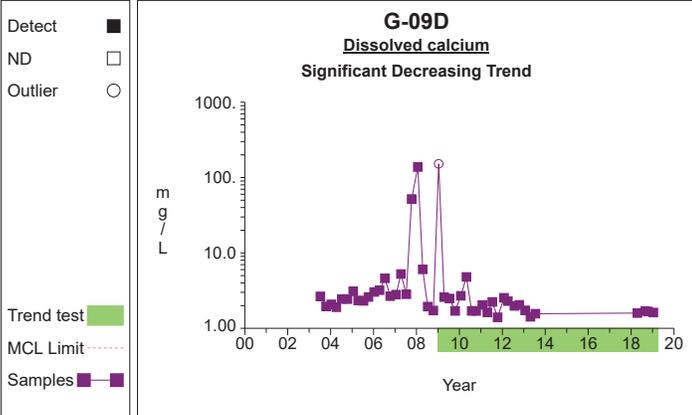
False Positive and False Negative Rates for Current Upgradient vs. Downgradient Monitoring Program



Cathcart Landfill

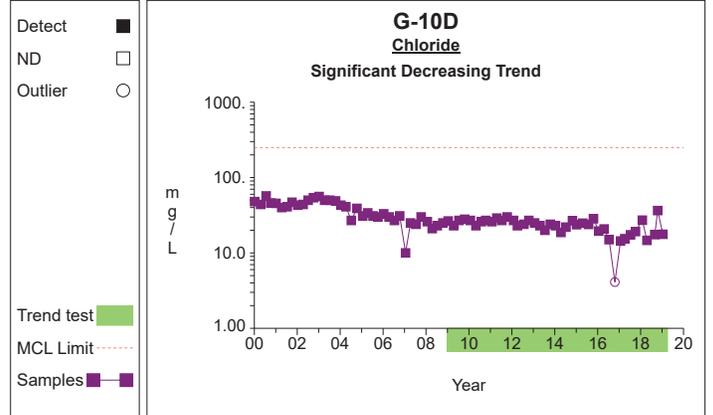


Time Series



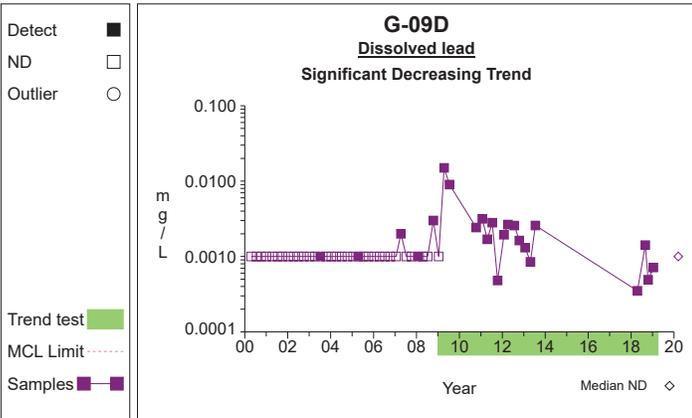
Graph 144

Time Series



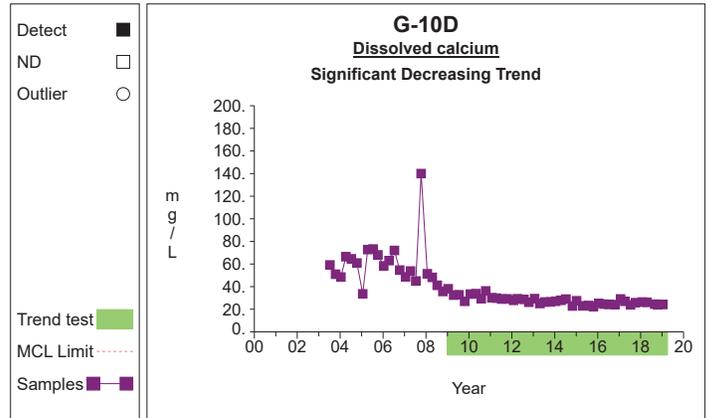
Graph 170

Time Series



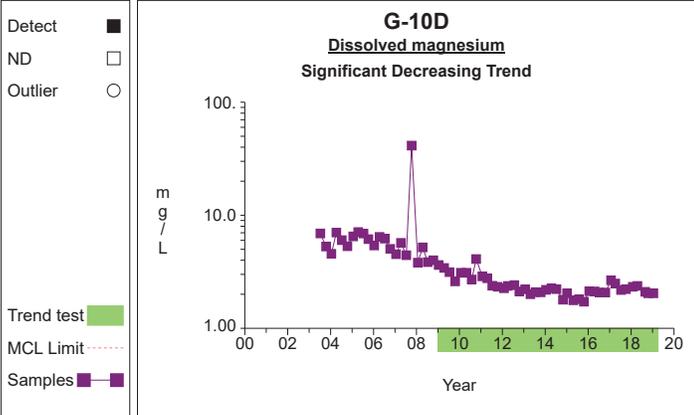
Graph 149

Time Series



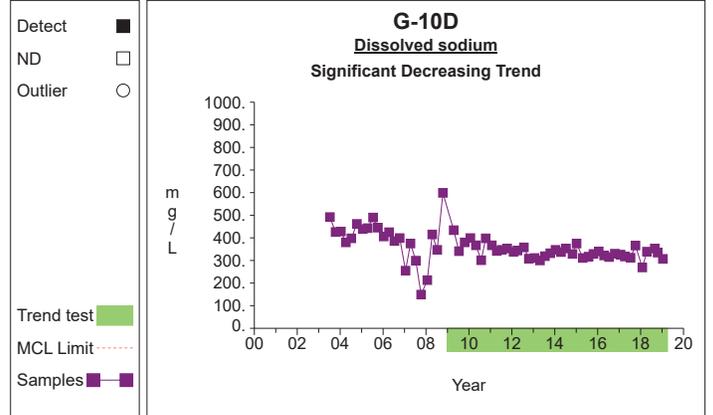
Graph 177

Time Series



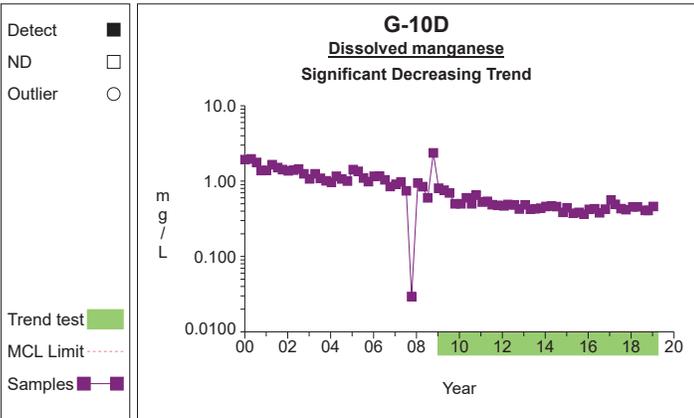
Graph 183

Time Series



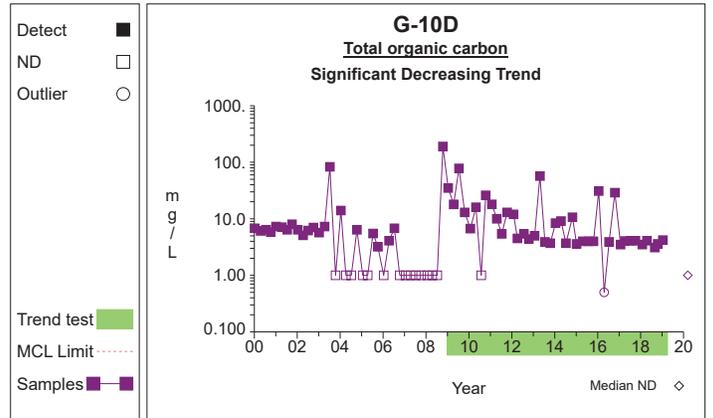
Graph 189

Time Series



Graph 184

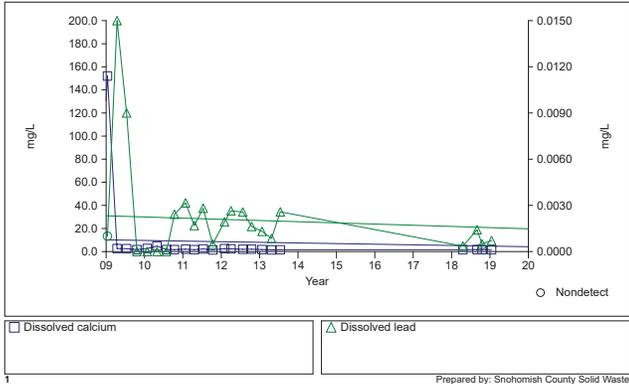
Time Series



Graph 198

Cathcart Landfill

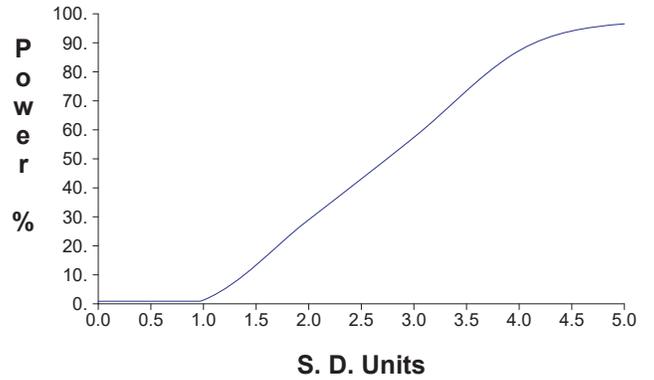
Time Series Plot for G-09D



Cathcart Landfill [CCDEEP]

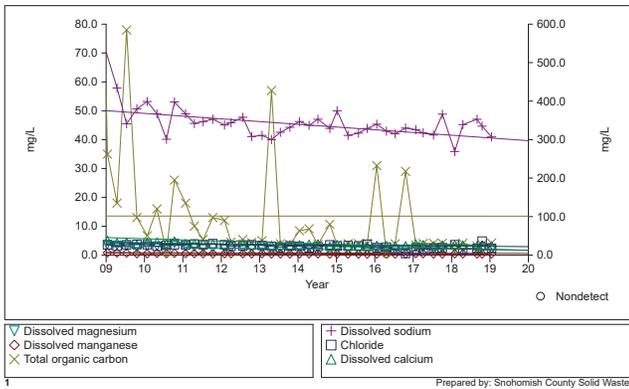
Analysis prepared on: 5/16/2019

False Positive and False Negative Rates for Current Intra-Well Prediction Limits Monitoring Program



Cathcart Landfill

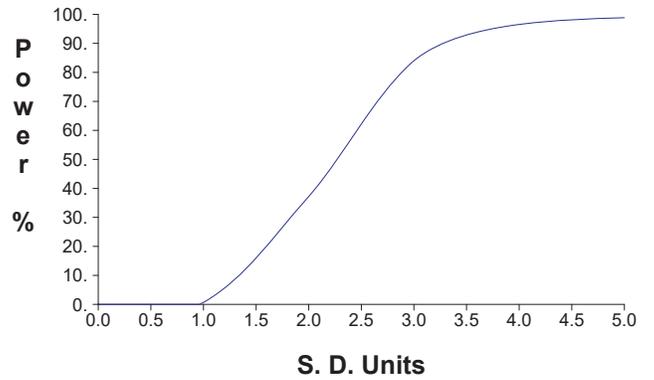
Time Series Plot for G-10D

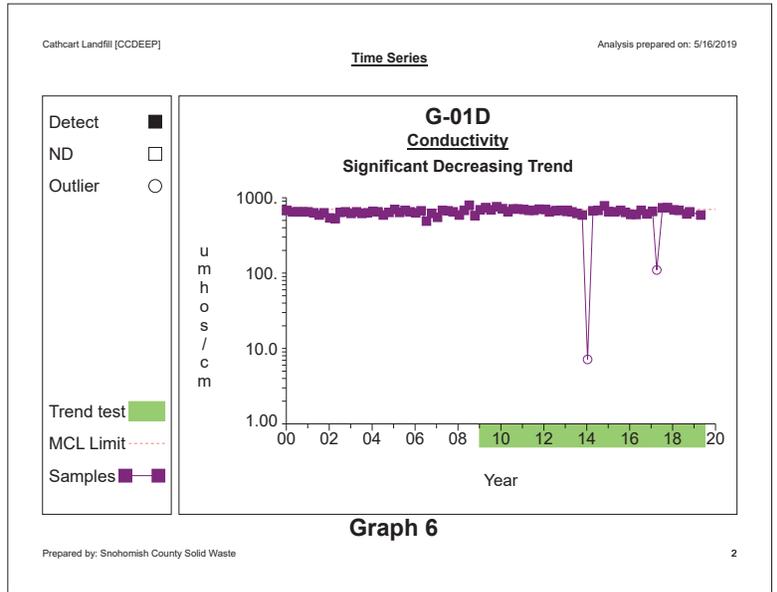
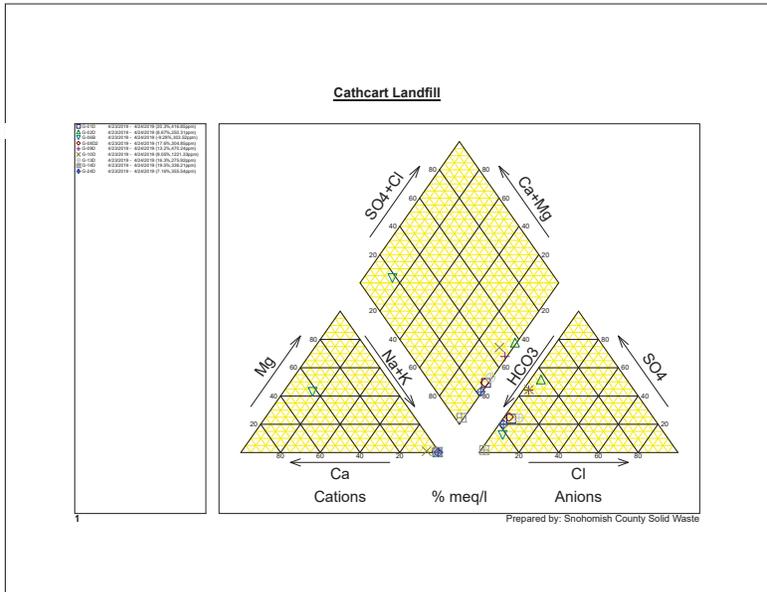
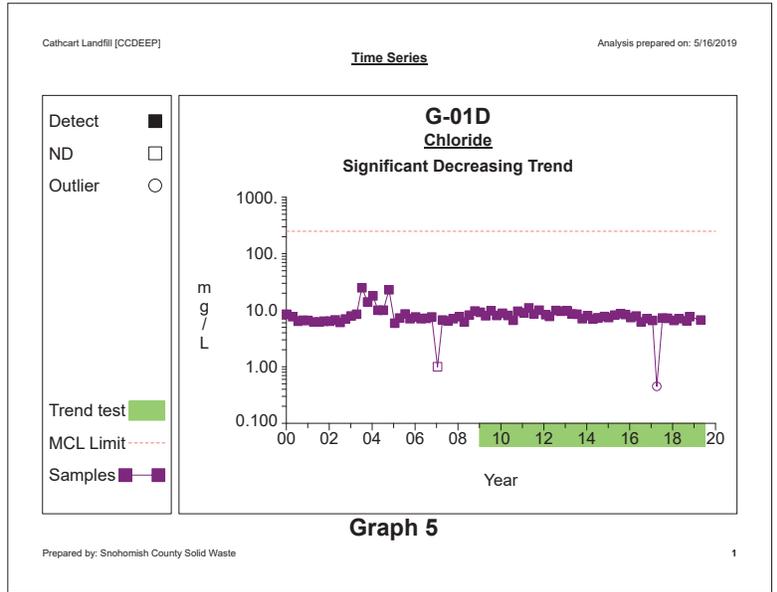
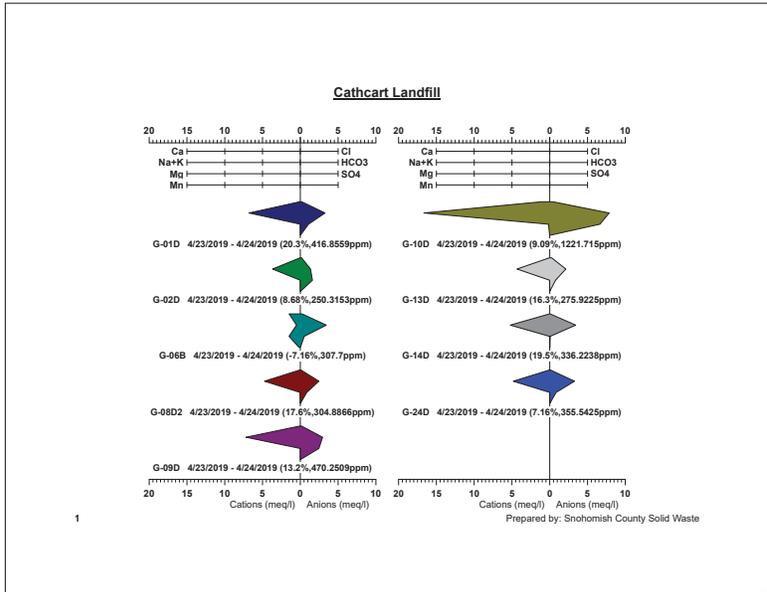


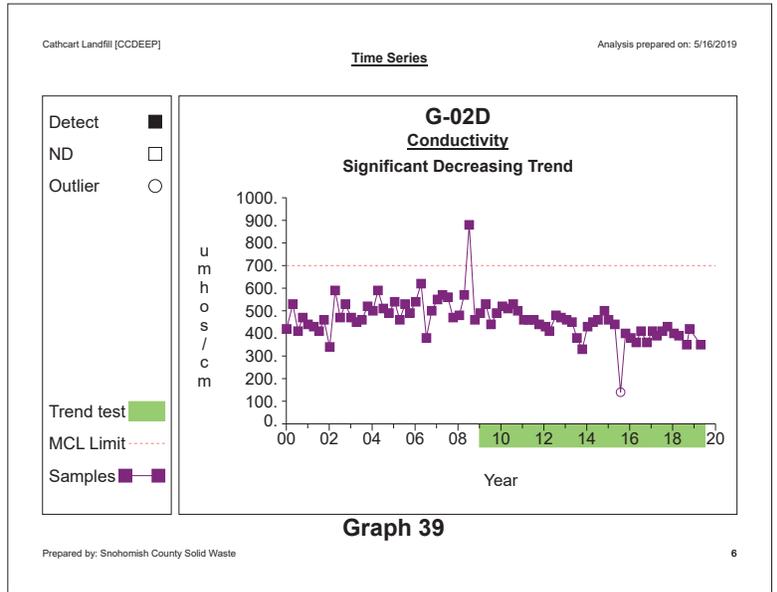
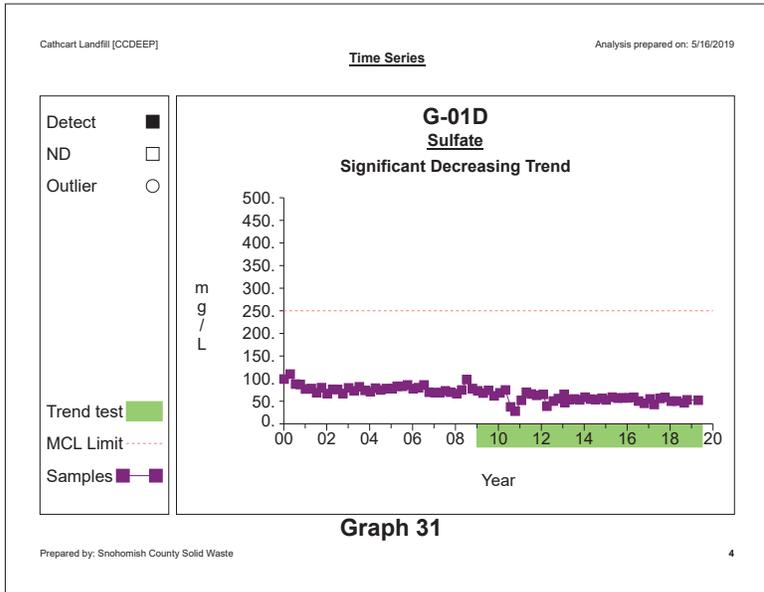
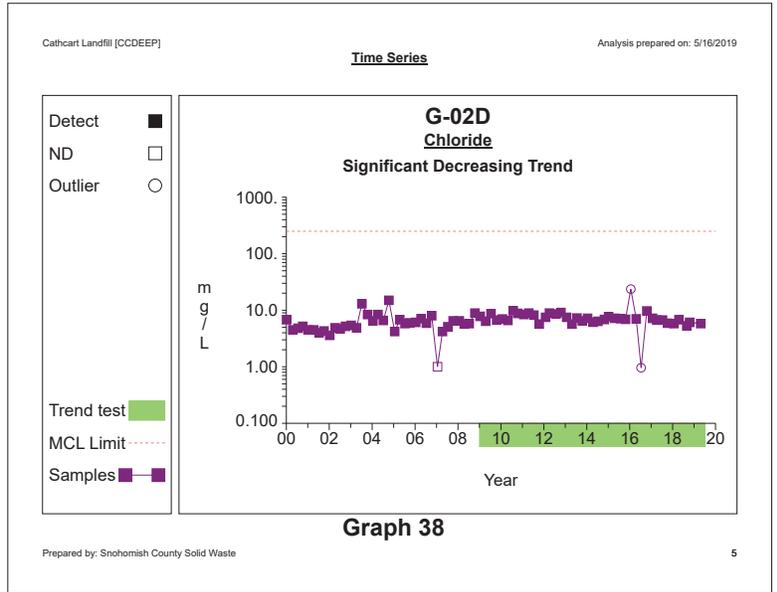
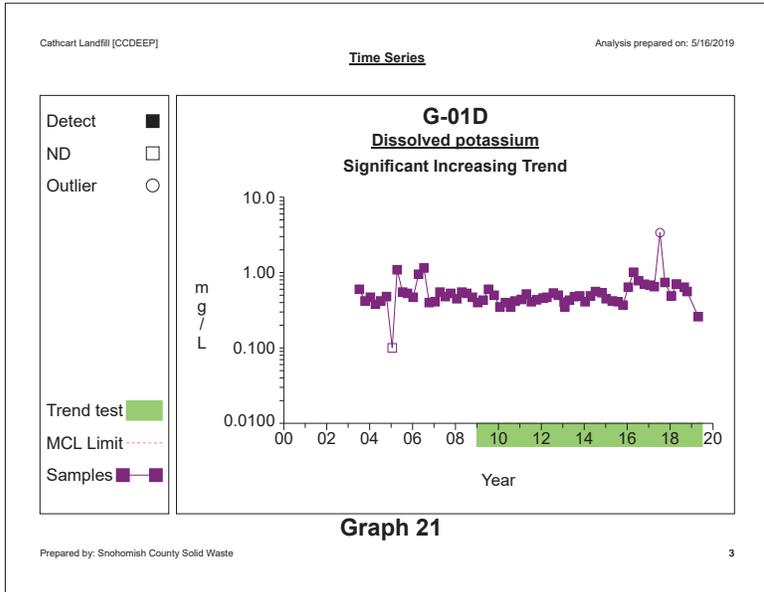
Cathcart Landfill [CCDEEP]

Analysis prepared on: 5/16/2019

False Positive and False Negative Rates for Current Upgradient vs. Downgradient Monitoring Program

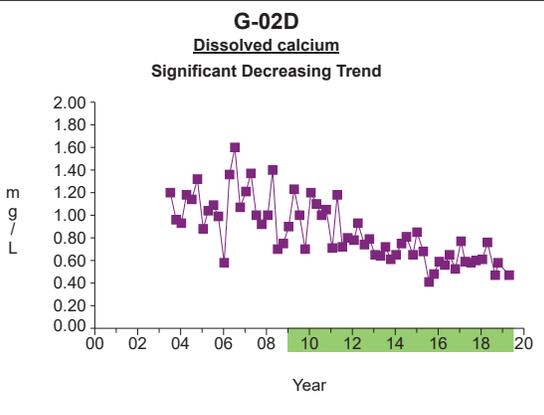






Time Series

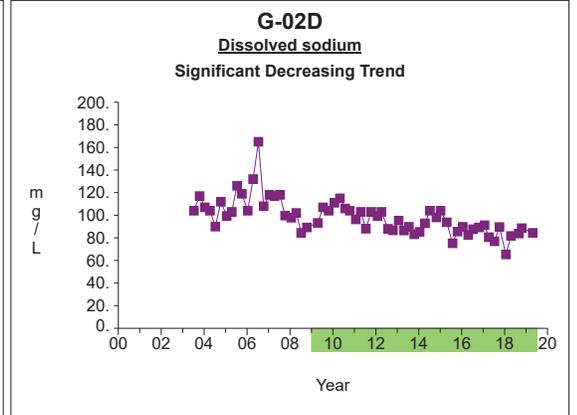
- Detect
- ND
- Outlier



Graph 45

Time Series

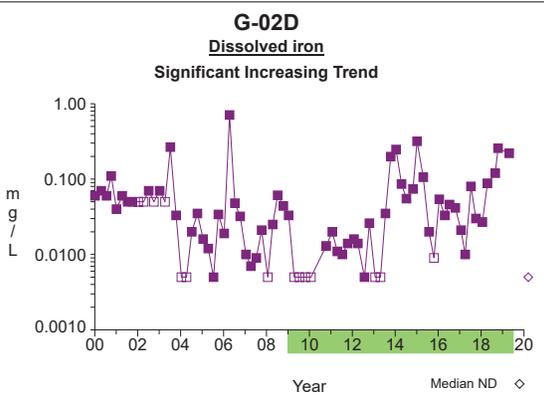
- Detect
- ND
- Outlier



Graph 57

Time Series

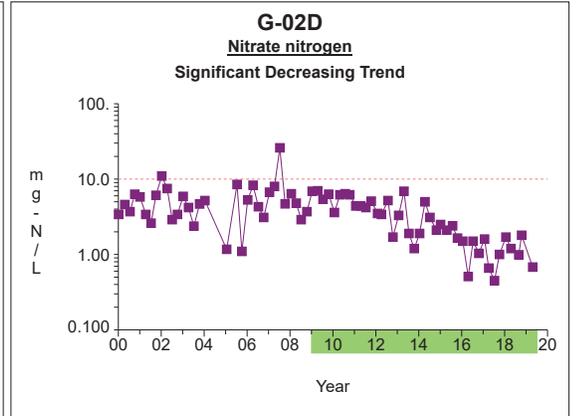
- Detect
- ND
- Outlier



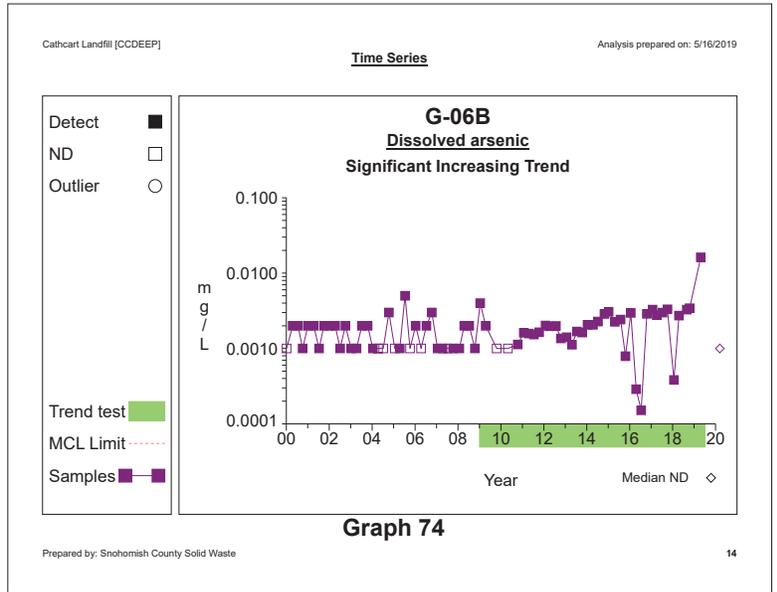
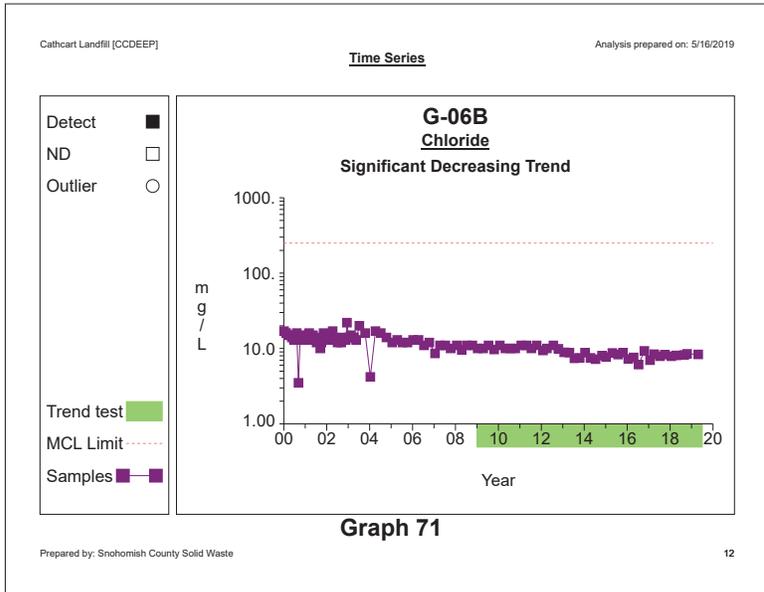
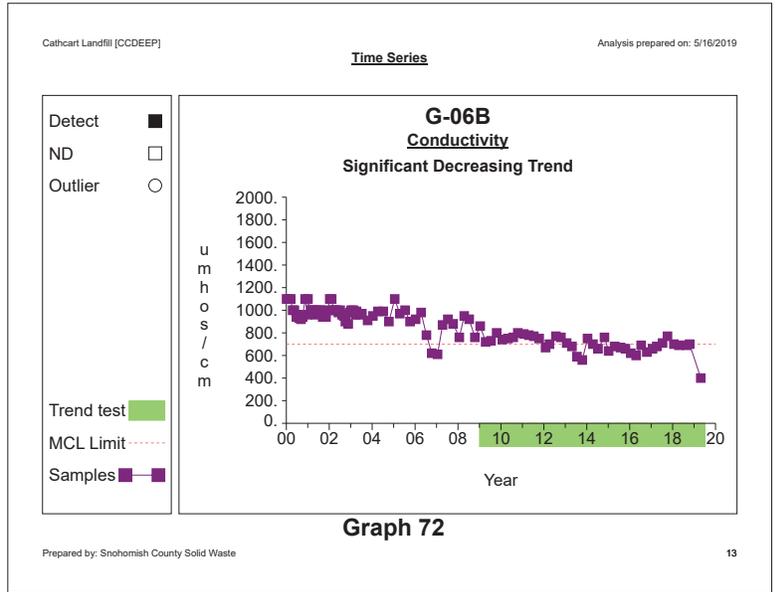
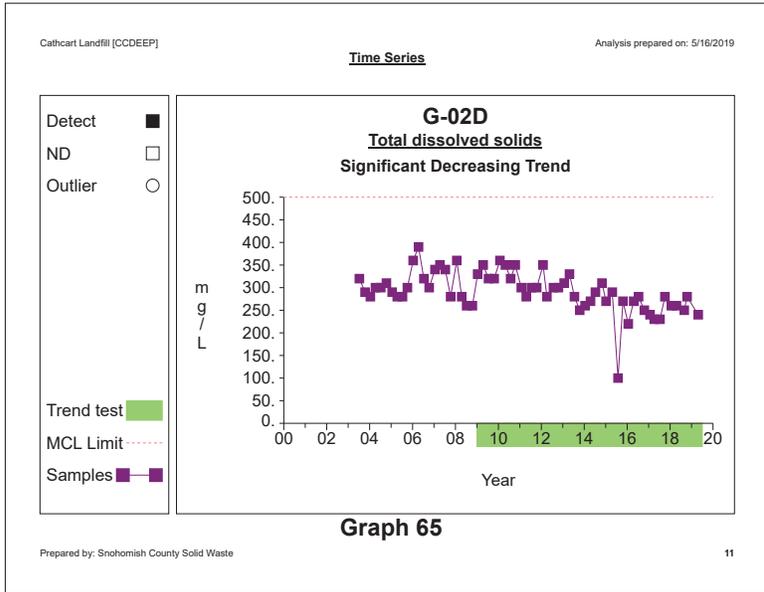
Graph 49

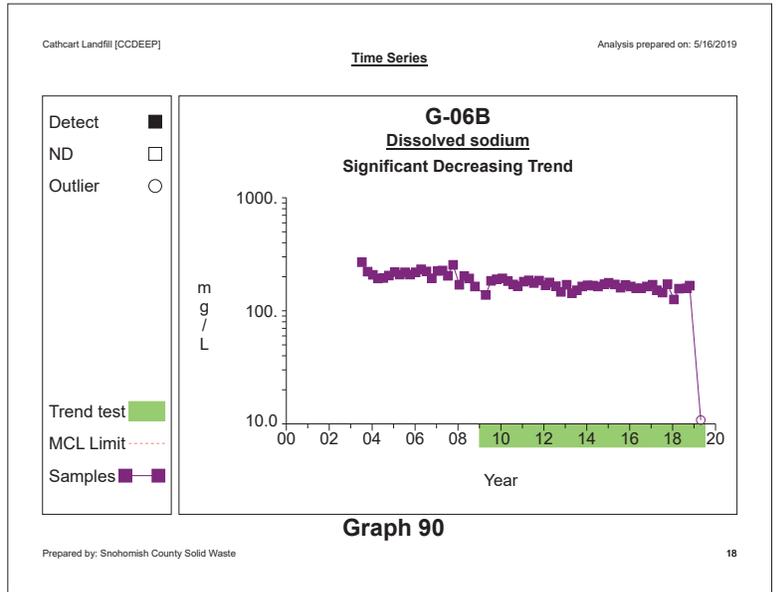
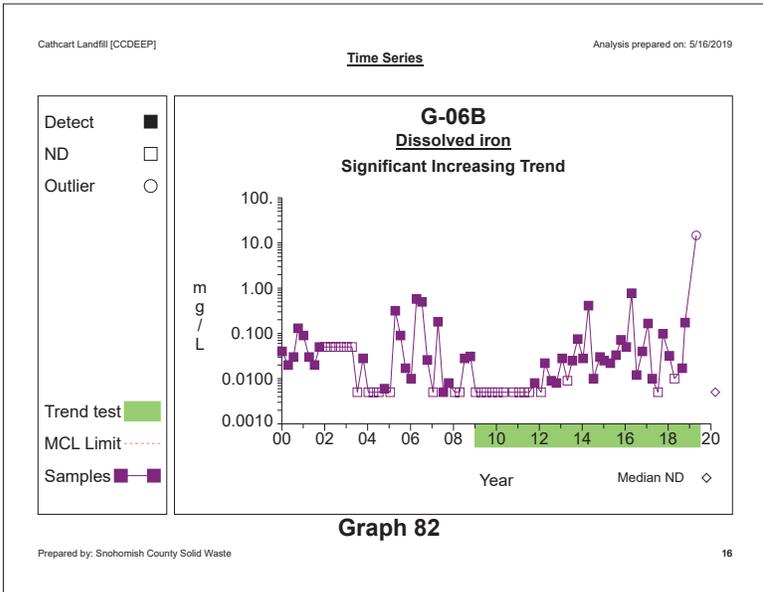
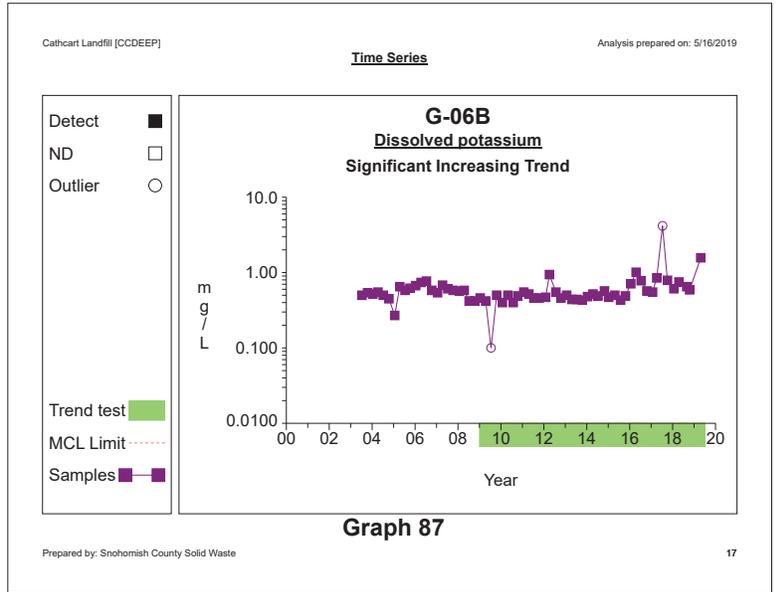
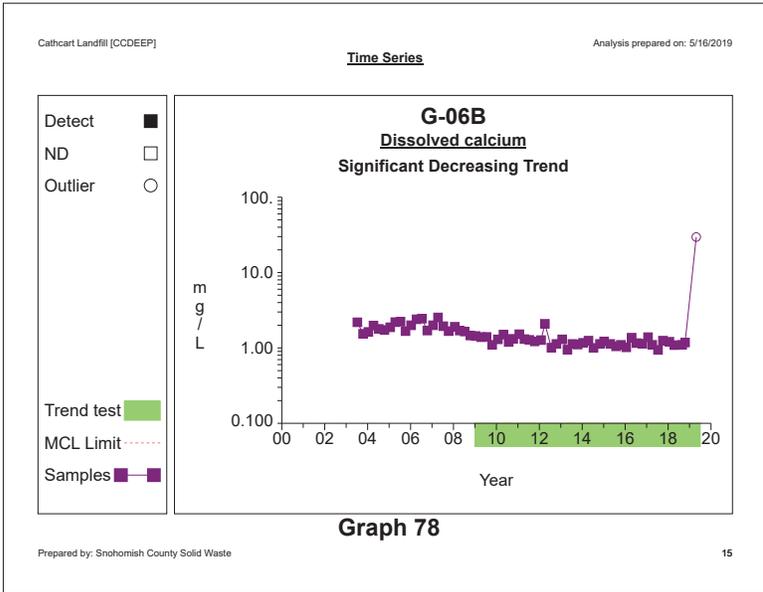
Time Series

- Detect
- ND
- Outlier

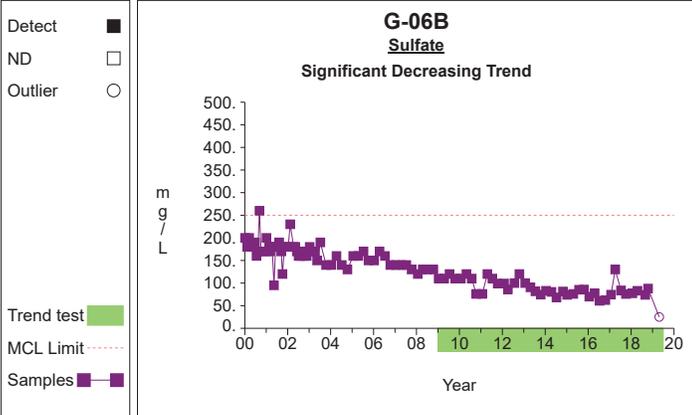


Graph 61



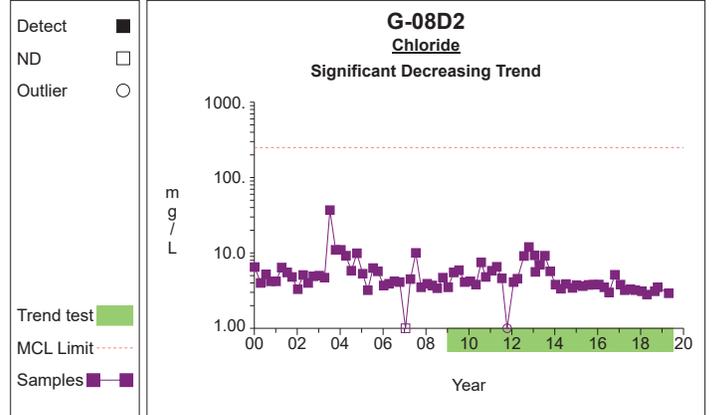


Time Series



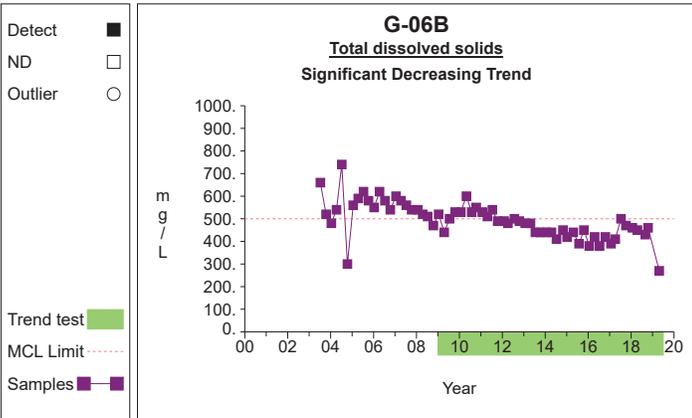
Graph 97

Time Series



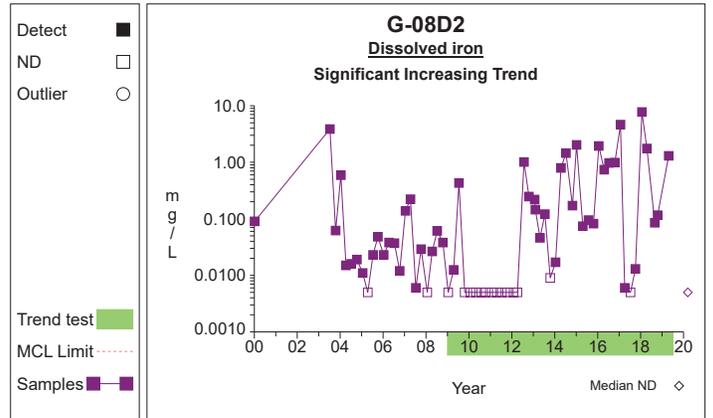
Graph 104

Time Series



Graph 98

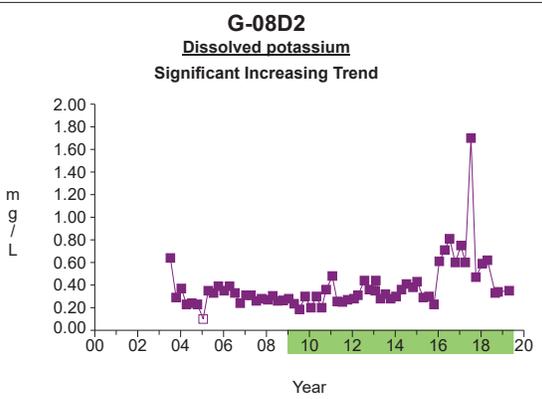
Time Series



Graph 115

Time Series

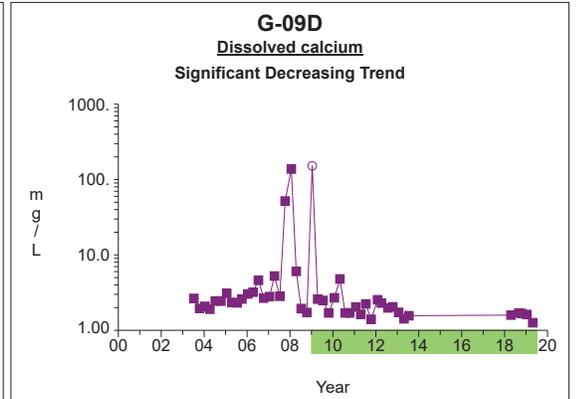
- Detect
- ND
- Outlier



Graph 120

Time Series

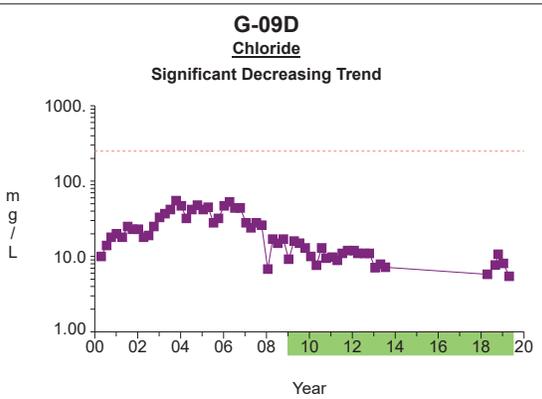
- Detect
- ND
- Outlier



Graph 144

Time Series

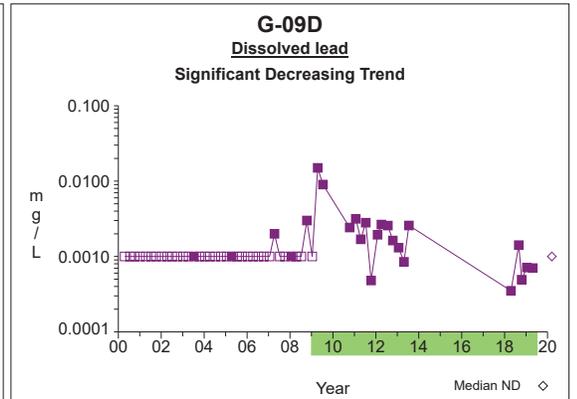
- Detect
- ND
- Outlier



Graph 137

Time Series

- Detect
- ND
- Outlier

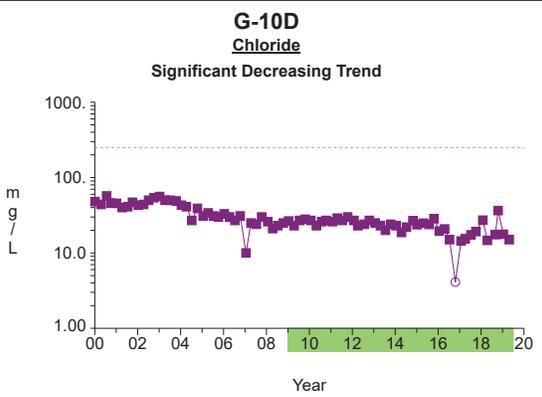


Graph 149

Time Series

- Detect
- ND
- Outlier

- Trend test
- MCL Limit
- Samples

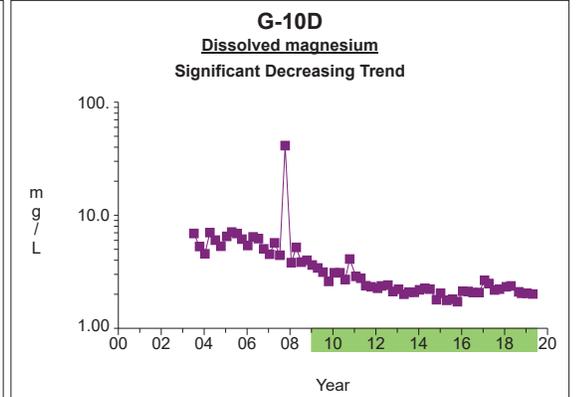


Graph 170

Time Series

- Detect
- ND
- Outlier

- Trend test
- MCL Limit
- Samples

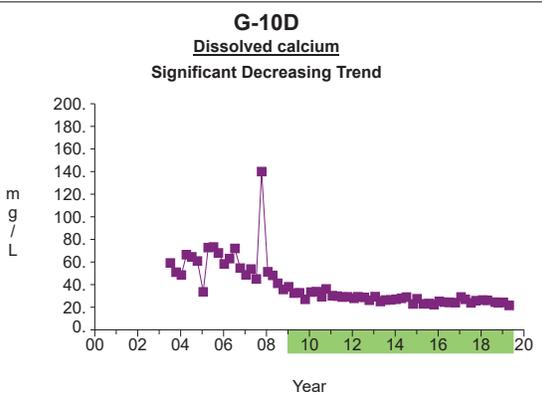


Graph 183

Time Series

- Detect
- ND
- Outlier

- Trend test
- MCL Limit
- Samples

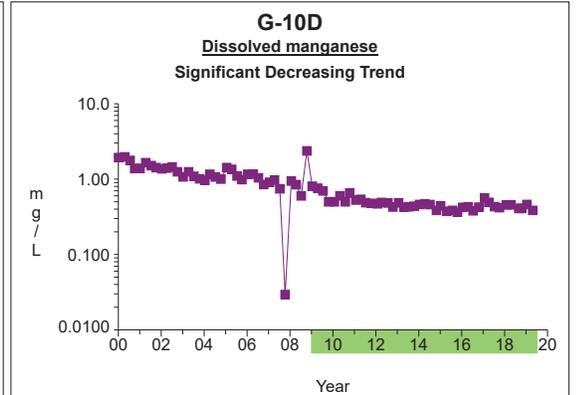


Graph 177

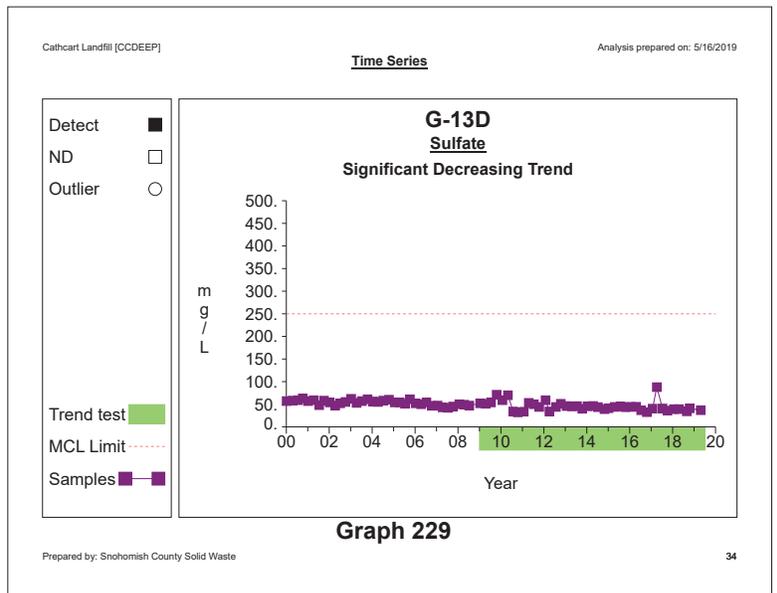
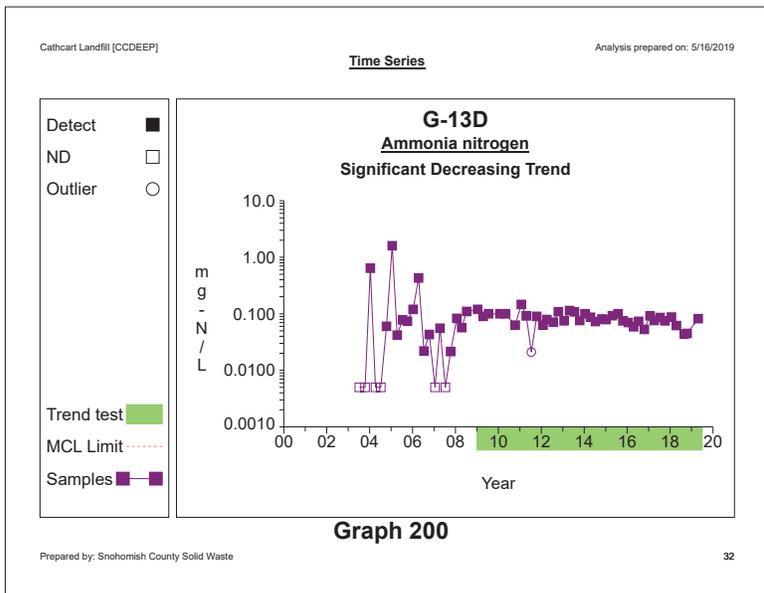
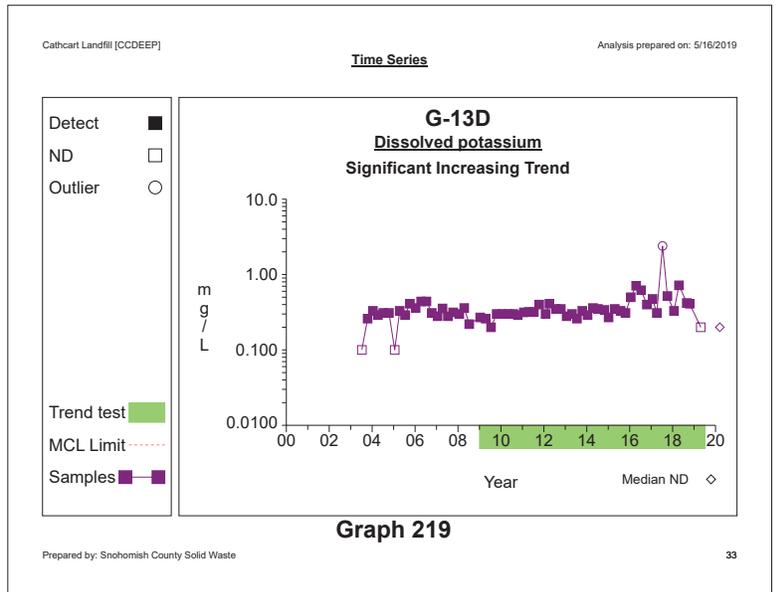
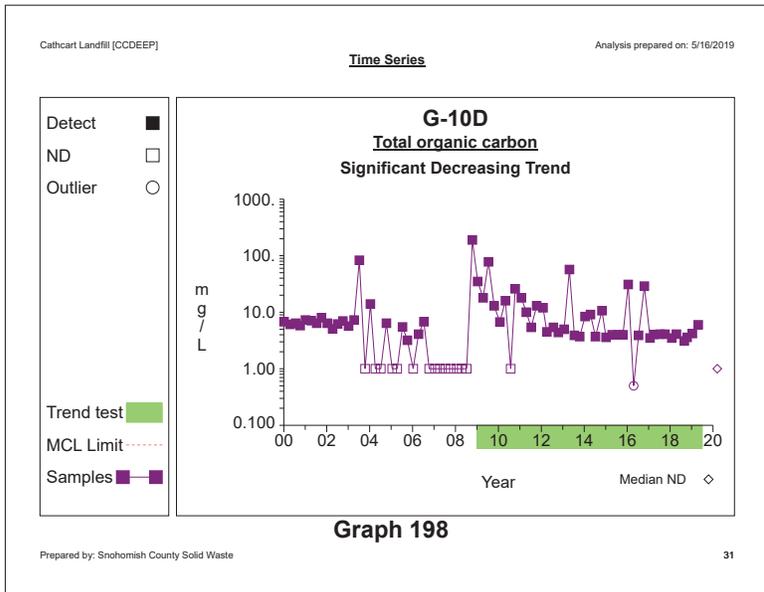
Time Series

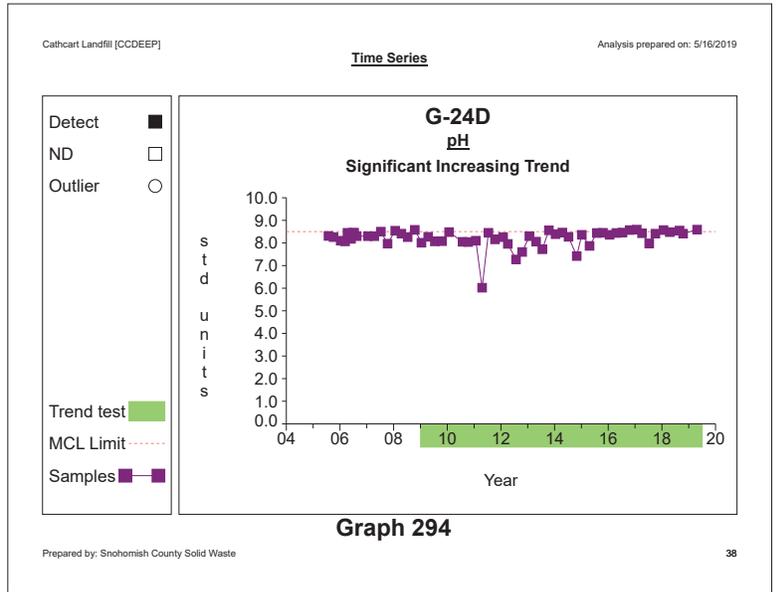
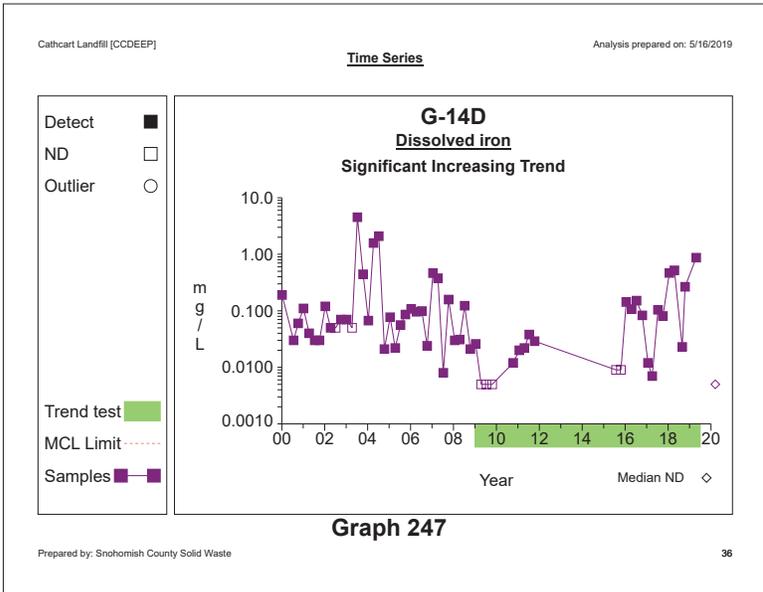
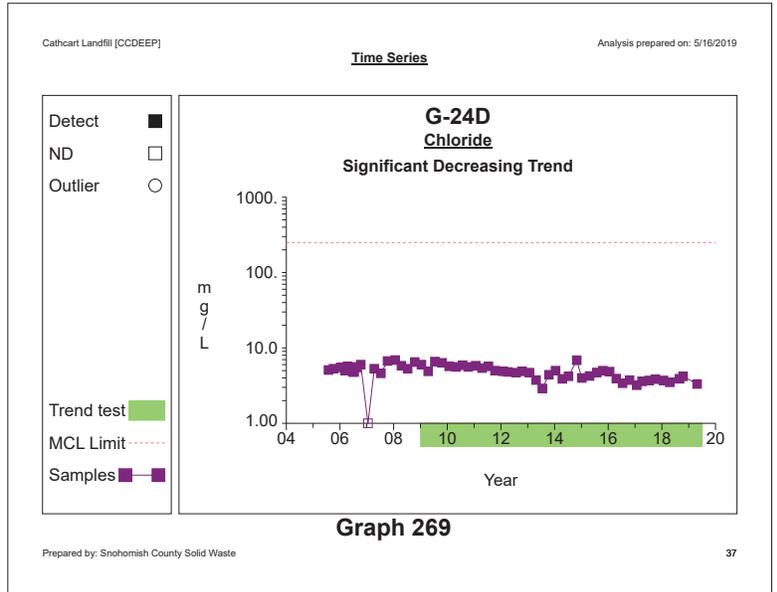
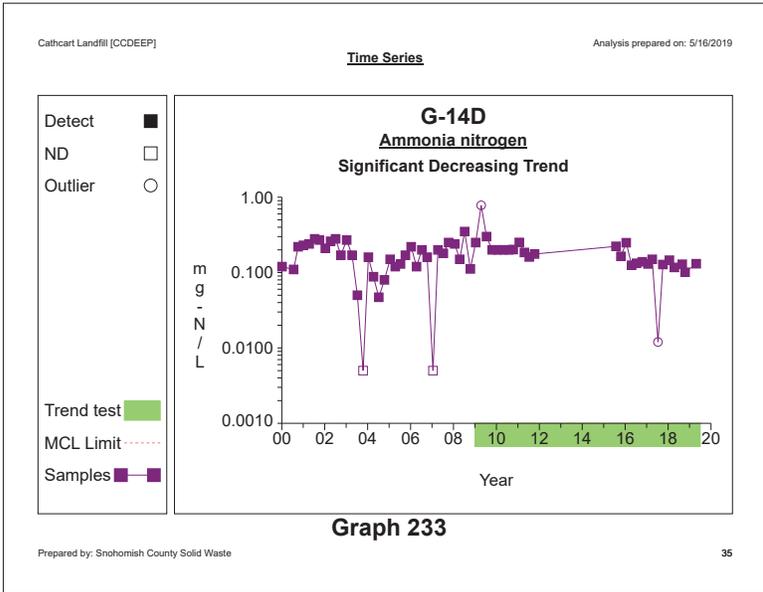
- Detect
- ND
- Outlier

- Trend test
- MCL Limit
- Samples



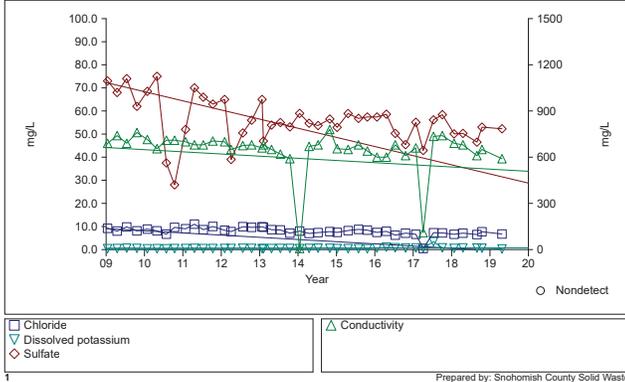
Graph 184





Cathcart Landfill

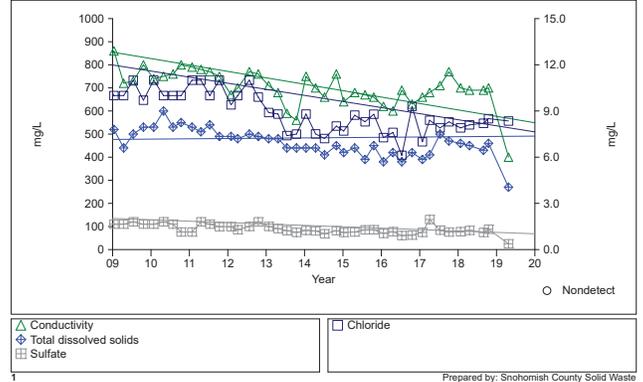
Time Series Plot for G-01D



Prepared by: Snohomish County Solid Waste

Cathcart Landfill

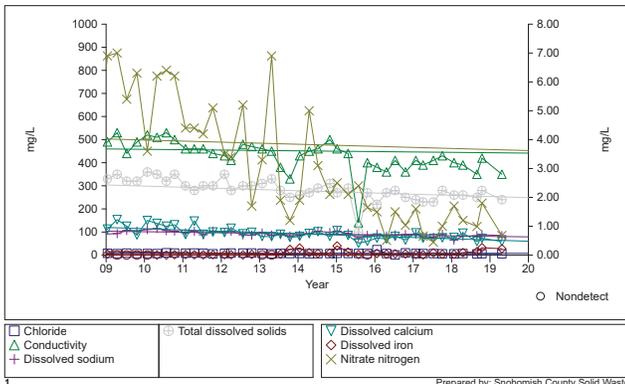
Time Series Plot for G-06B



Prepared by: Snohomish County Solid Waste

Cathcart Landfill

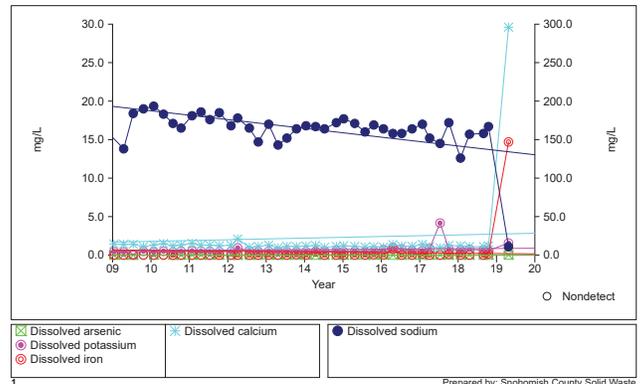
Time Series Plot for G-02D



Prepared by: Snohomish County Solid Waste

Cathcart Landfill

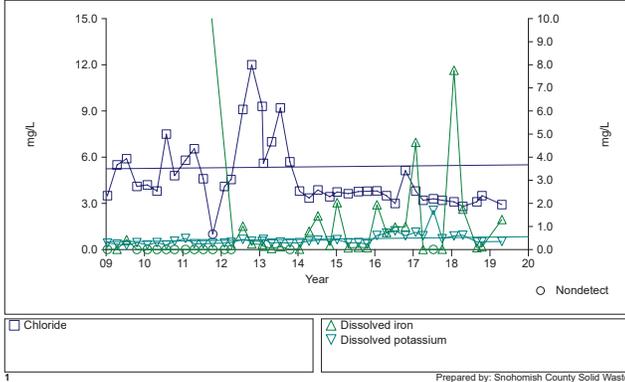
Time Series Plot for G-06B



Prepared by: Snohomish County Solid Waste

Cathcart Landfill

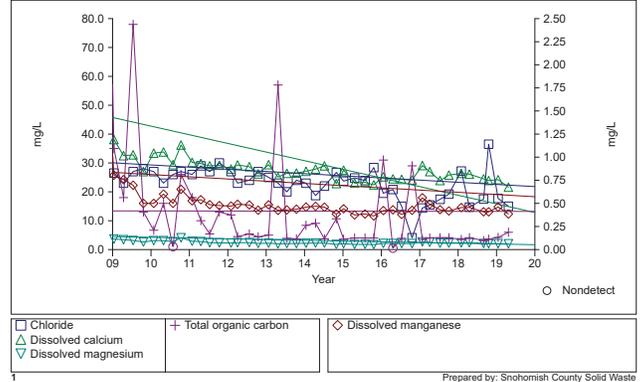
Time Series Plot for G-08D2



Prepared by: Snohomish County Solid Waste

Cathcart Landfill

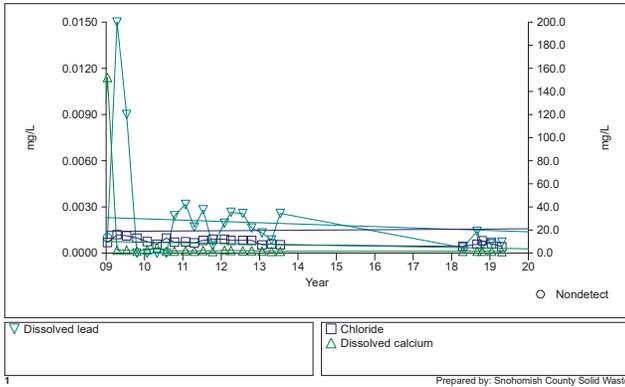
Time Series Plot for G-10D



Prepared by: Snohomish County Solid Waste

Cathcart Landfill

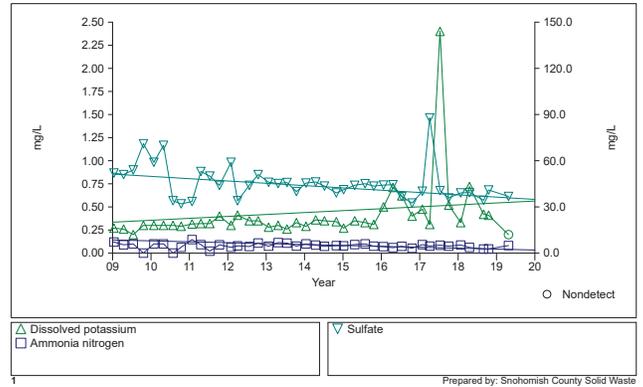
Time Series Plot for G-09D



Prepared by: Snohomish County Solid Waste

Cathcart Landfill

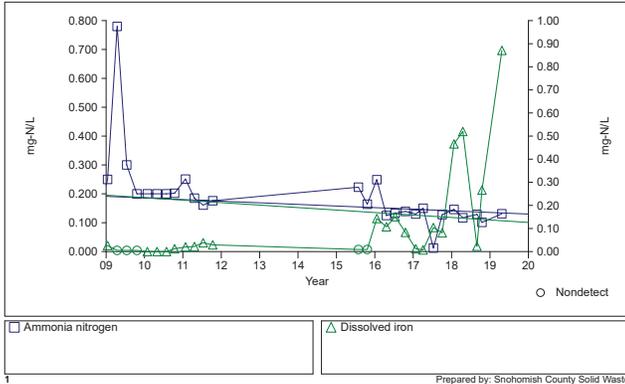
Time Series Plot for G-13D



Prepared by: Snohomish County Solid Waste

Cathcart Landfill

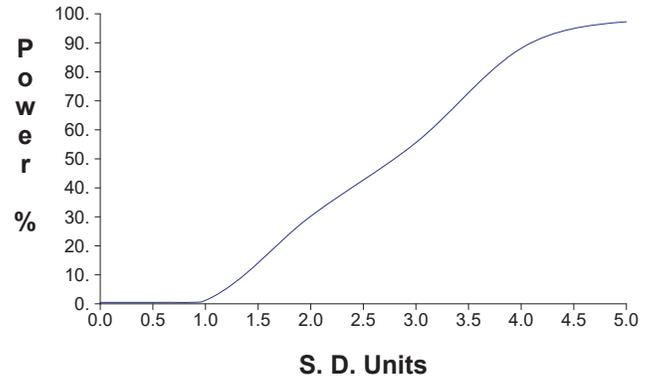
Time Series Plot for G-14D



Cathcart Landfill [CCDEEP]

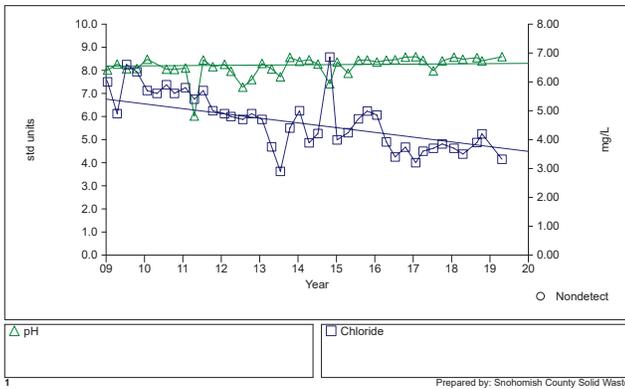
Analysis prepared on: 3/18/2020

False Positive and False Negative Rates for Current Intra-Well Prediction Limits Monitoring Program



Cathcart Landfill

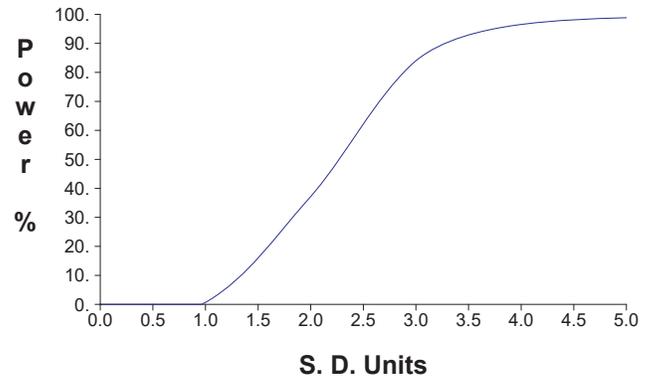
Time Series Plot for G-24D

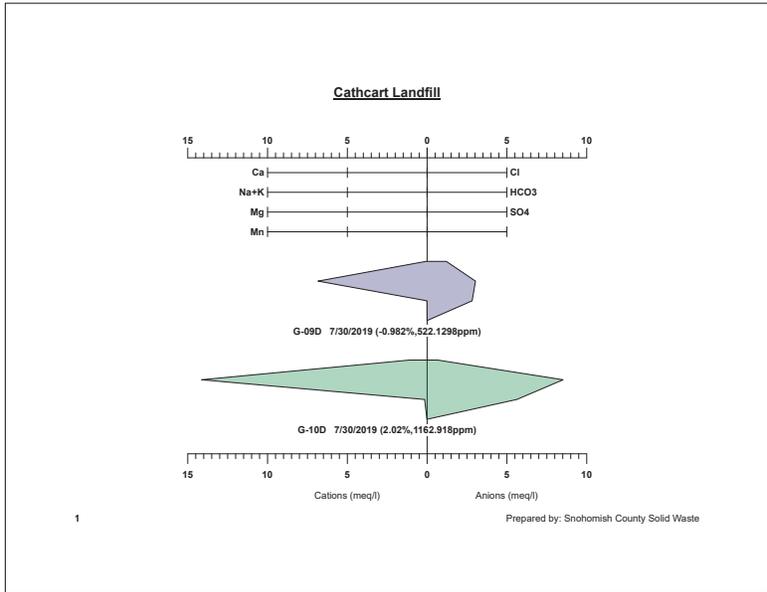


Cathcart Landfill [CCDEEP]

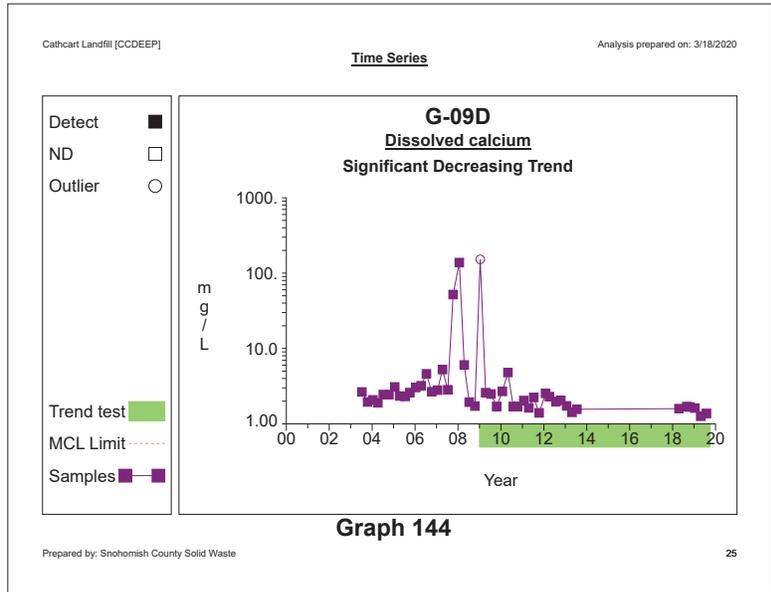
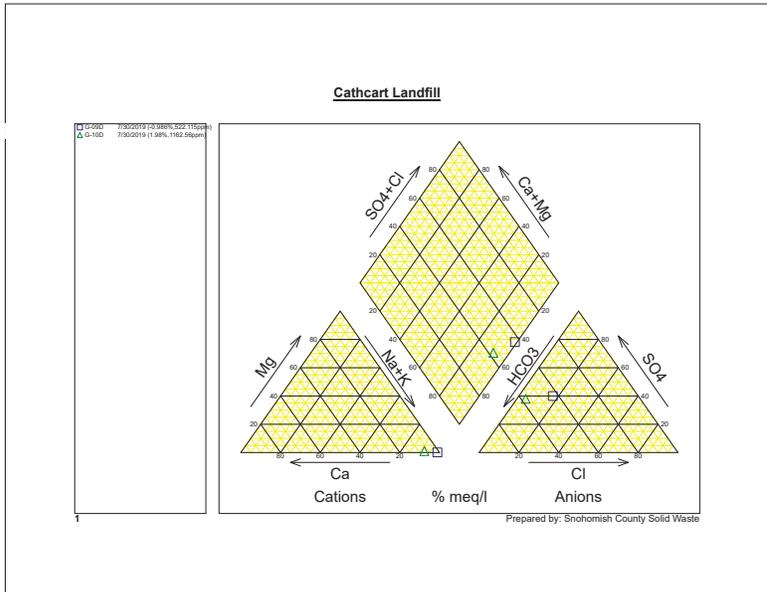
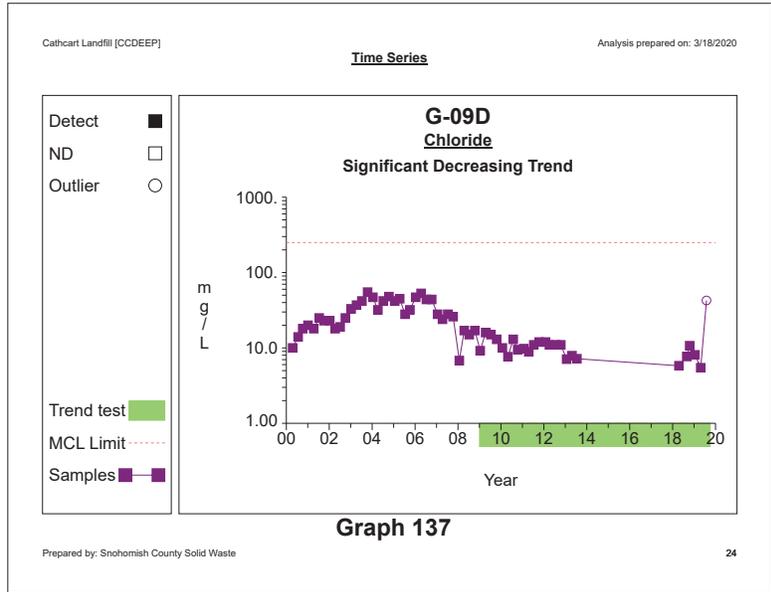
Analysis prepared on: 3/18/2020

False Positive and False Negative Rates for Current Upgradient vs. Downgradient Monitoring Program

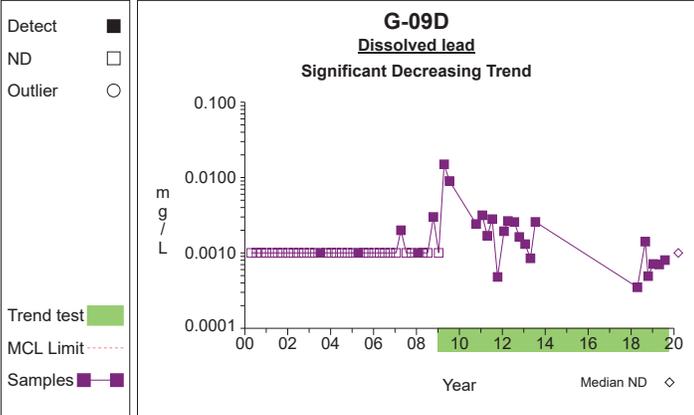




1

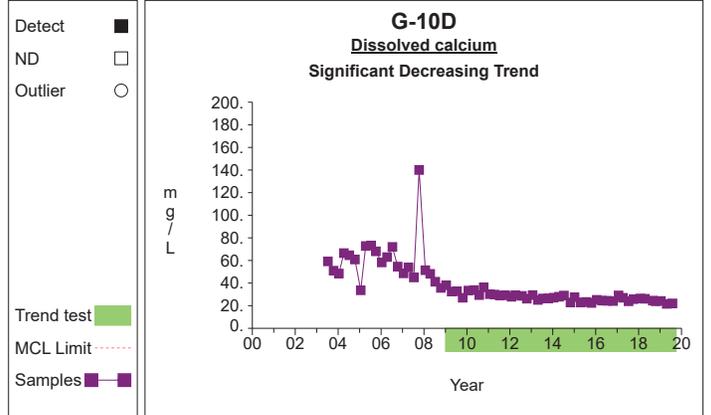


Time Series



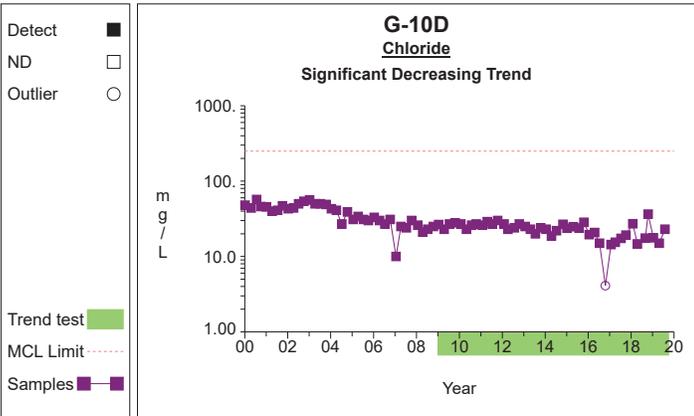
Graph 149

Time Series



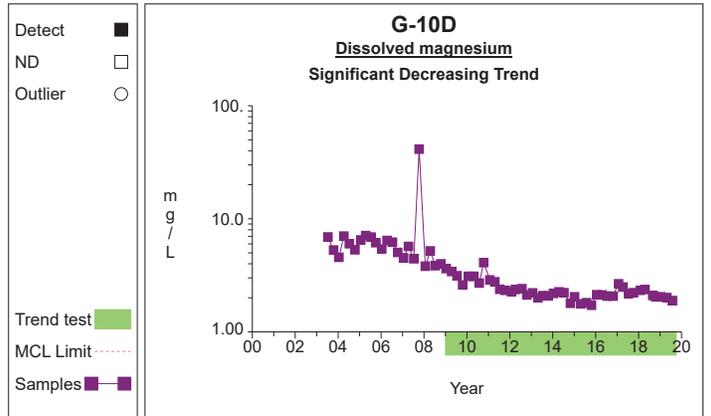
Graph 177

Time Series



Graph 170

Time Series

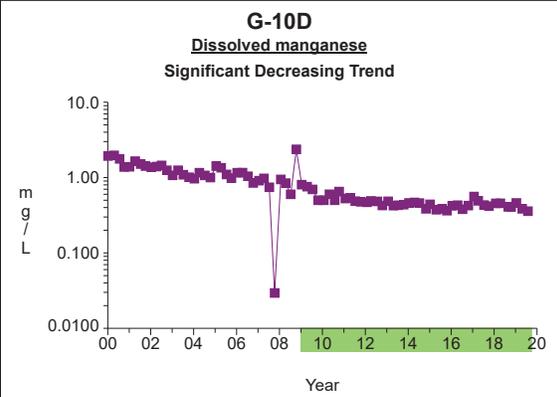


Graph 183

Time Series

- Detect
- ND
- Outlier

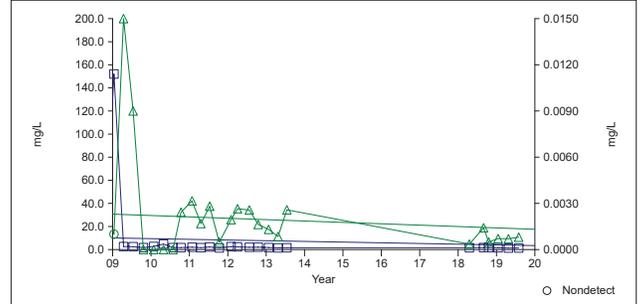
- Trend test
- MCL Limit
- Samples



Graph 184

Cathcart Landfill

Time Series Plot for G-09D



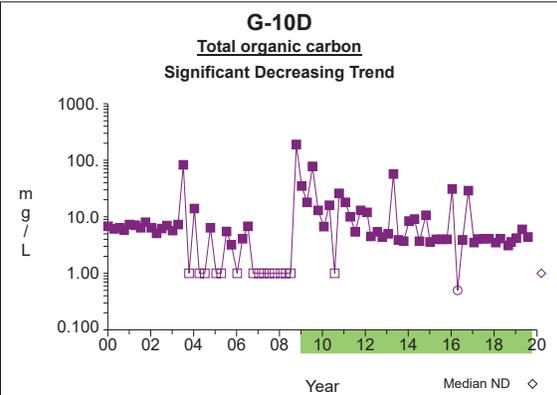
Legend for G-09D plot:

- Dissolved calcium
- Dissolved lead
- Nondetect

Time Series

- Detect
- ND
- Outlier

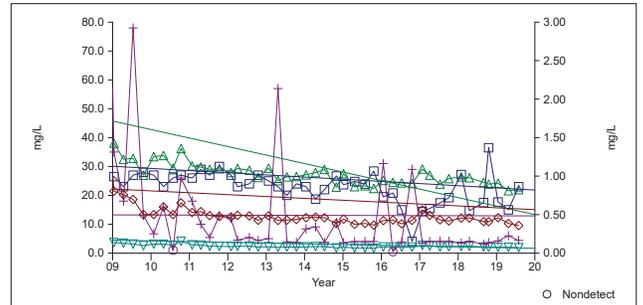
- Trend test
- MCL Limit
- Samples



Graph 198

Cathcart Landfill

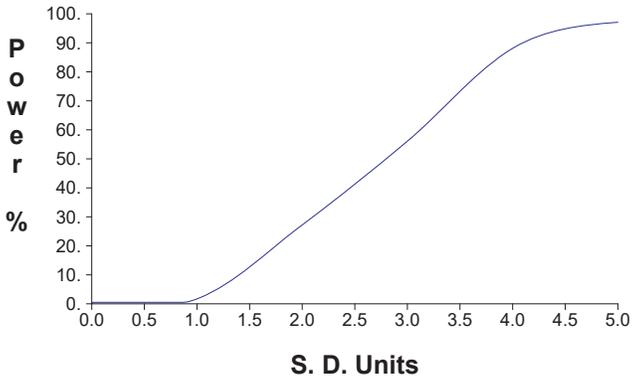
Time Series Plot for G-10D



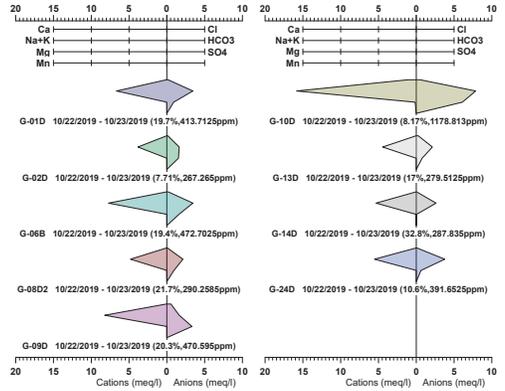
Legend for G-10D plot:

- Chloride
- Dissolved calcium
- Dissolved magnesium
- Total organic carbon
- Dissolved manganese
- Nondetect

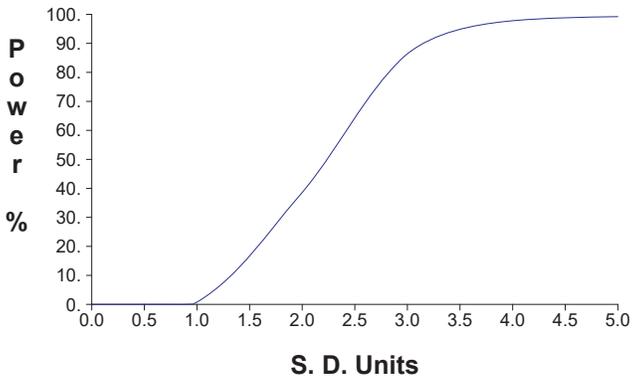
False Positive and False Negative Rates for Current Intra-Well Prediction Limits Monitoring Program



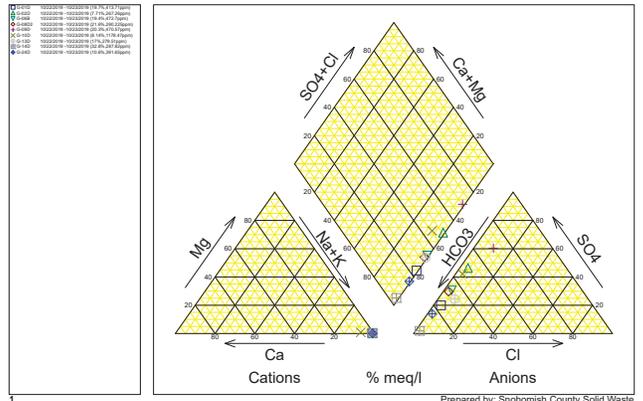
Cathcart Landfill

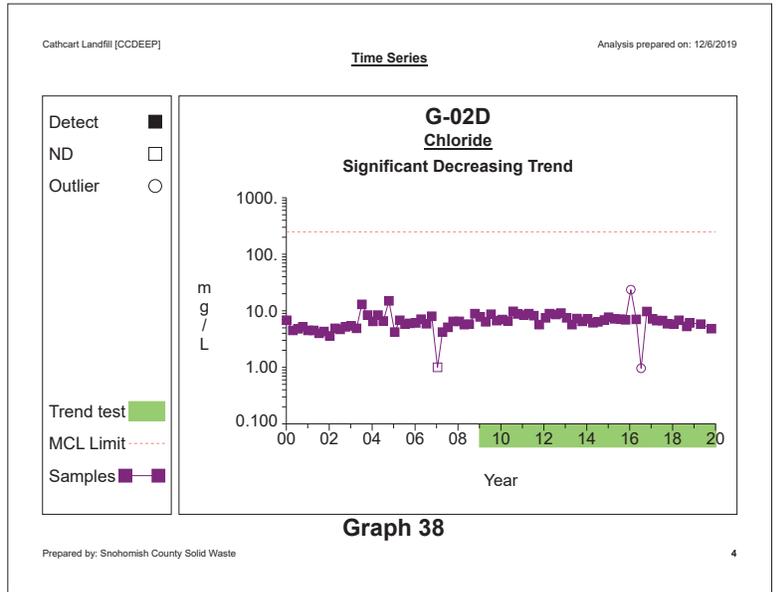
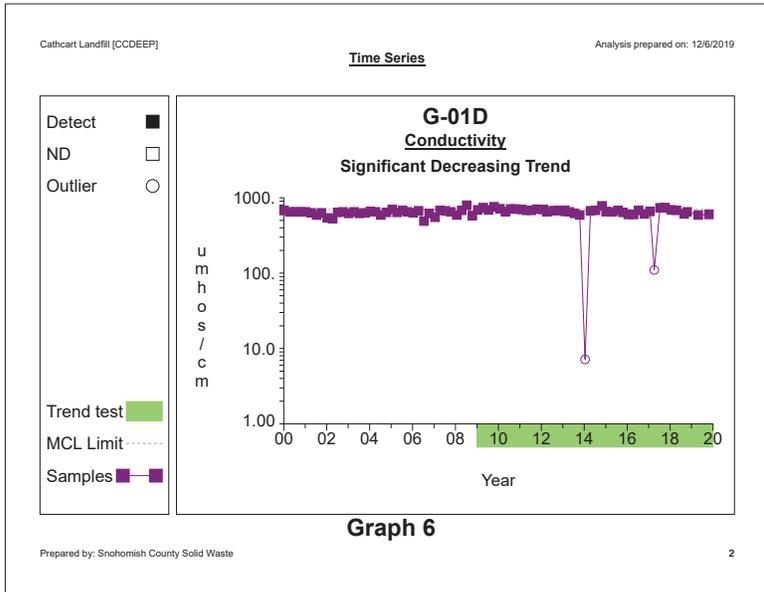
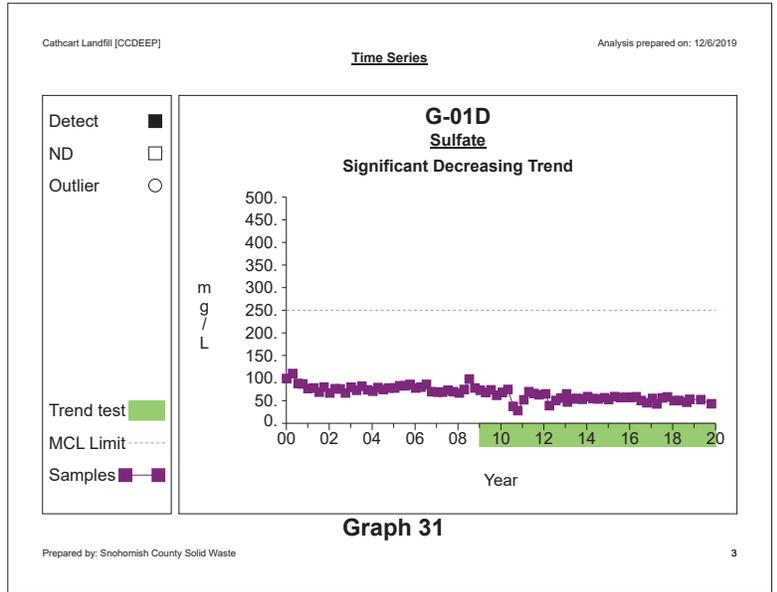
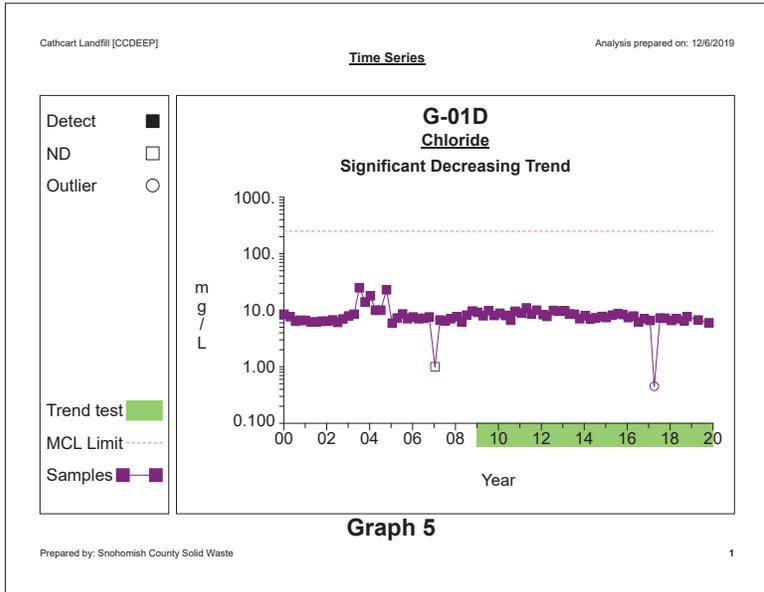


False Positive and False Negative Rates for Current Upgradient vs. Downgradient Monitoring Program



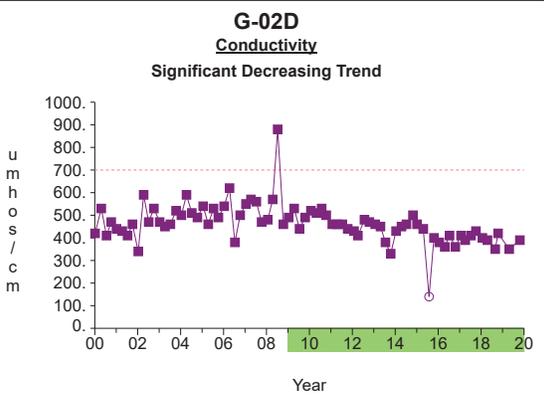
Cathcart Landfill





Time Series

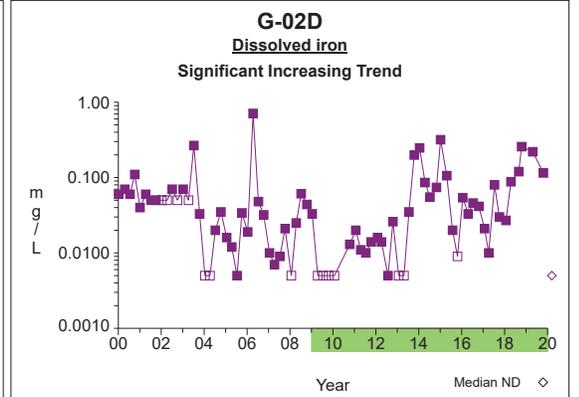
- Detect
- ND
- Outlier



Graph 39

Time Series

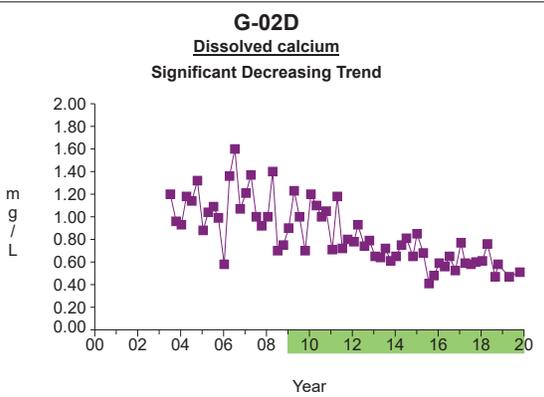
- Detect
- ND
- Outlier



Graph 49

Time Series

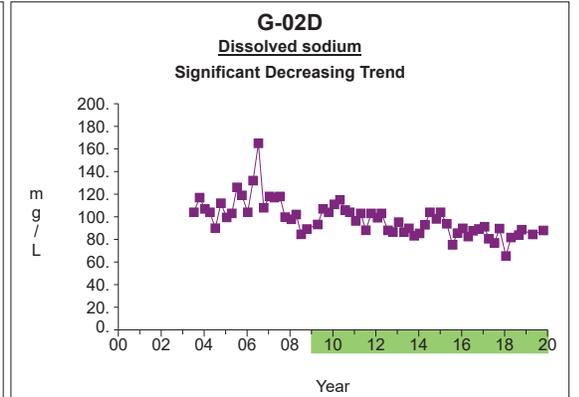
- Detect
- ND
- Outlier



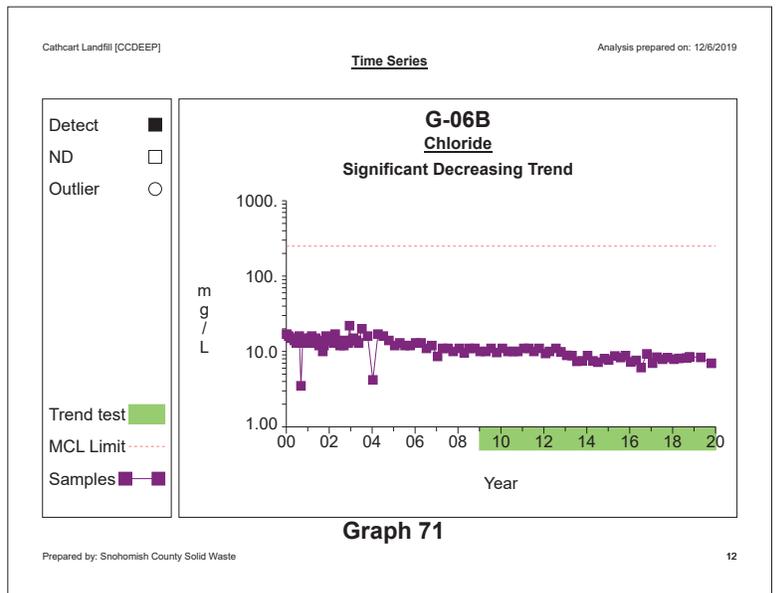
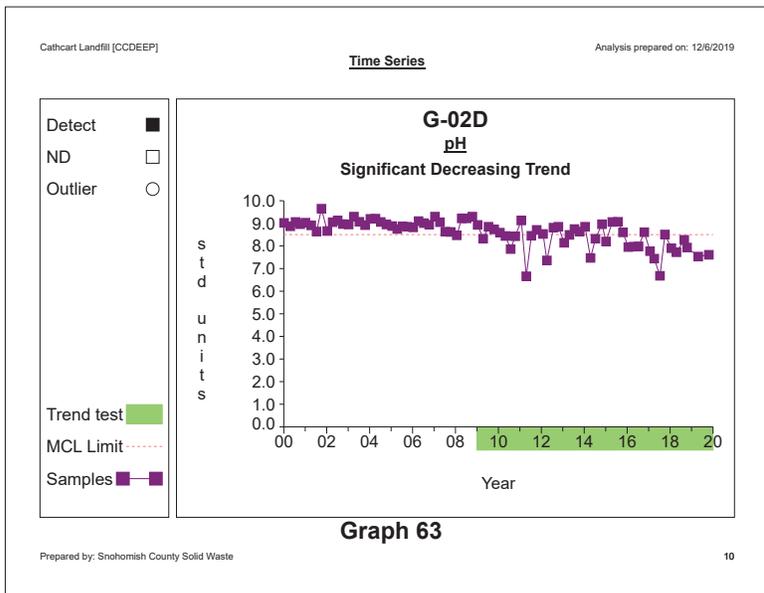
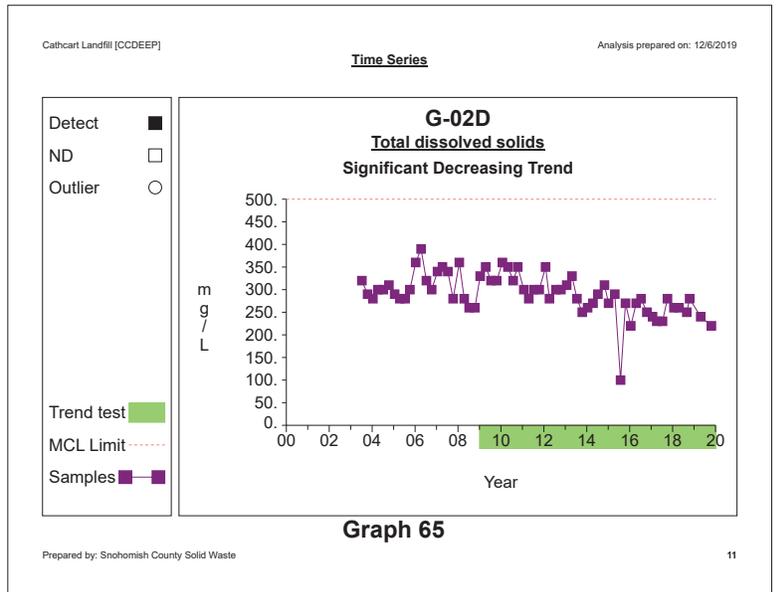
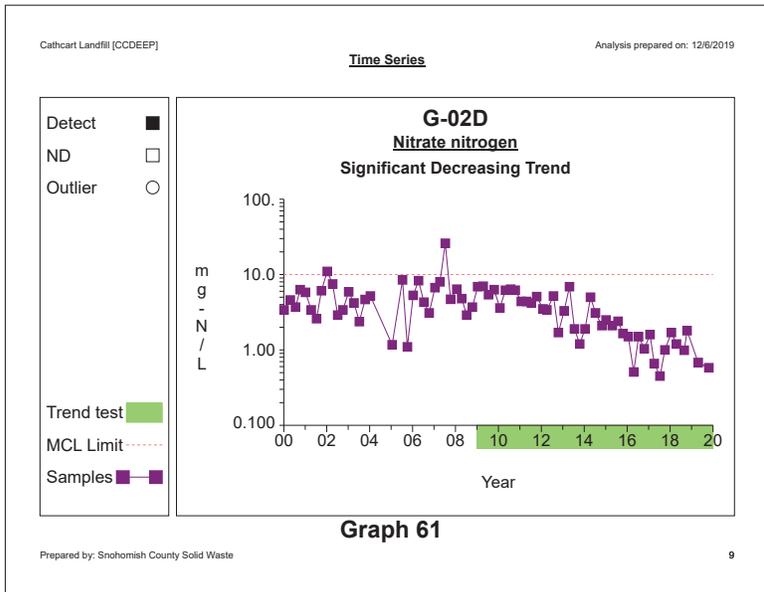
Graph 45

Time Series

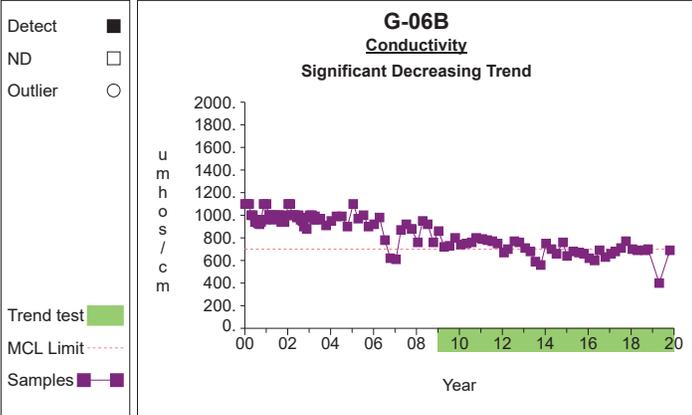
- Detect
- ND
- Outlier



Graph 57

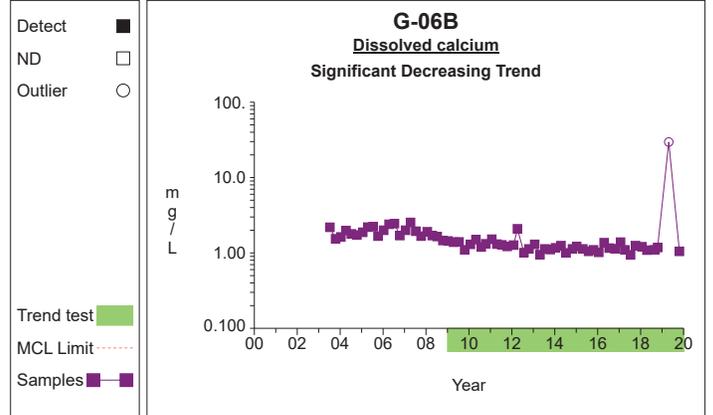


Time Series



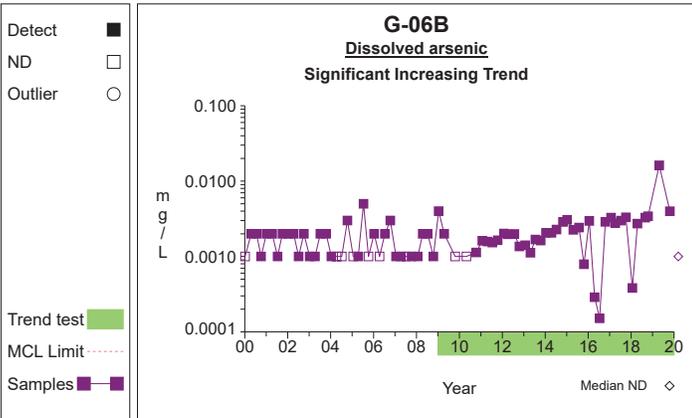
Graph 72

Time Series



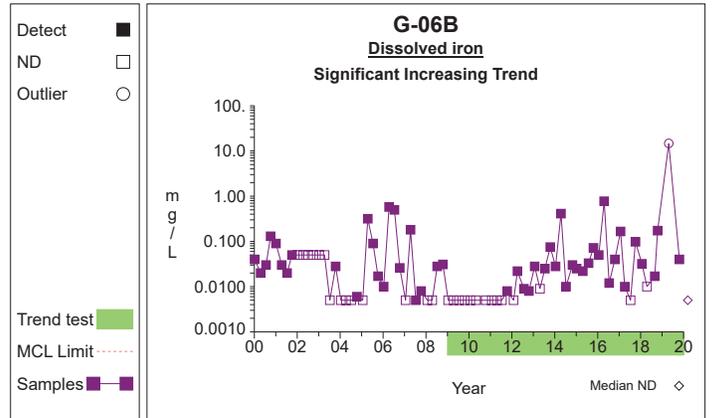
Graph 78

Time Series

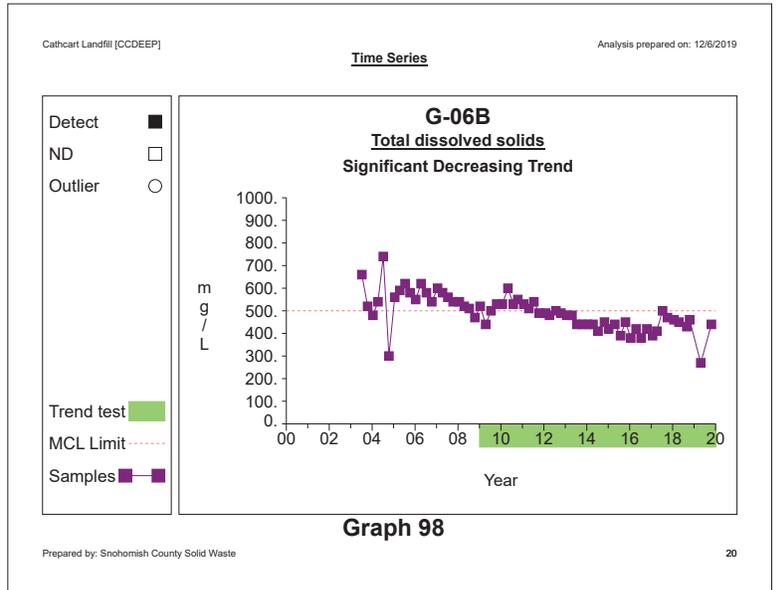
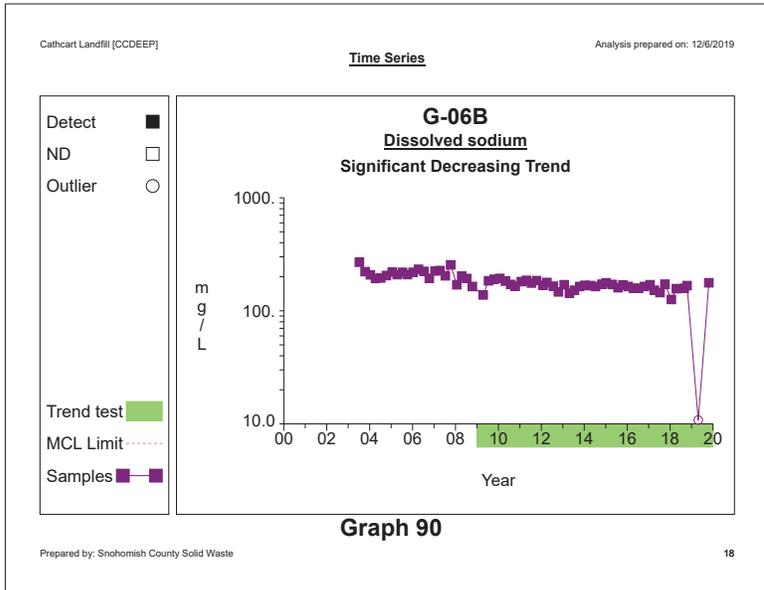
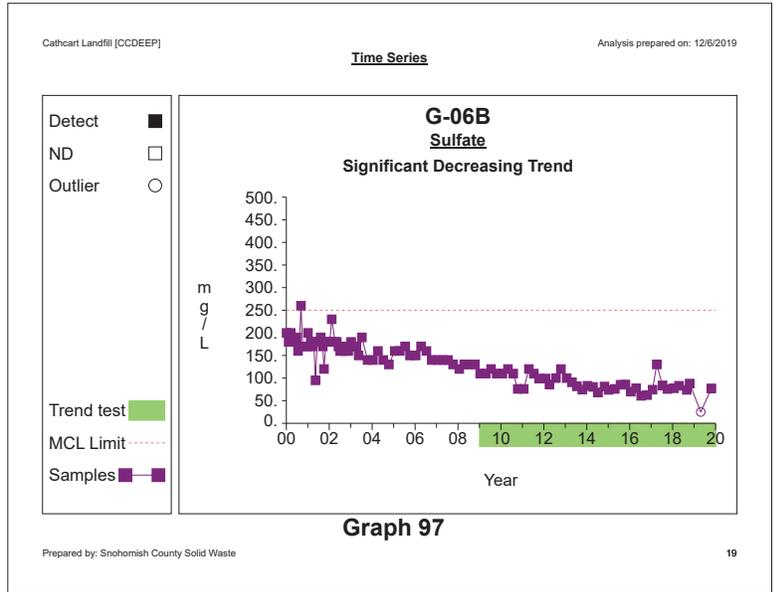
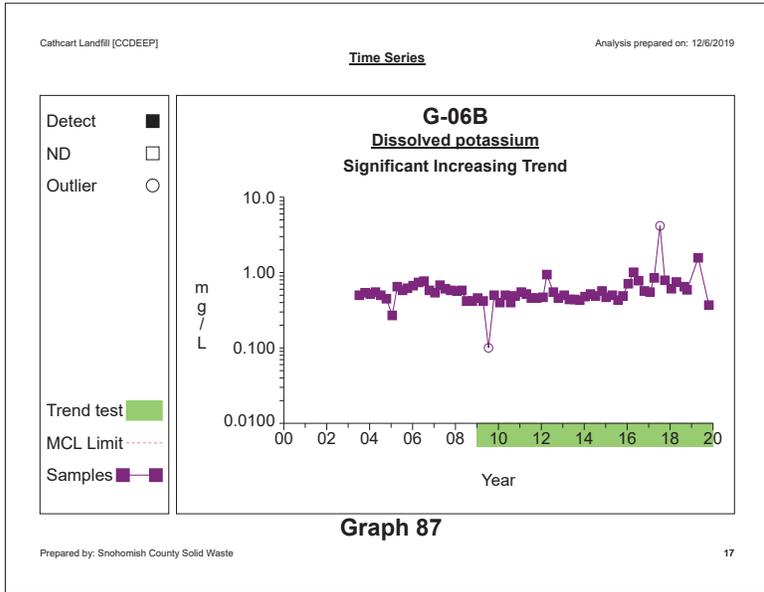


Graph 74

Time Series

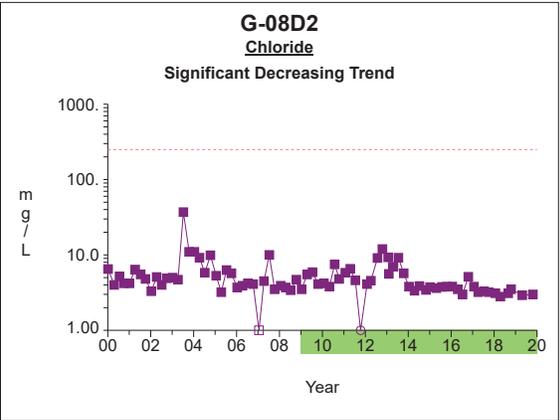


Graph 82



Time Series

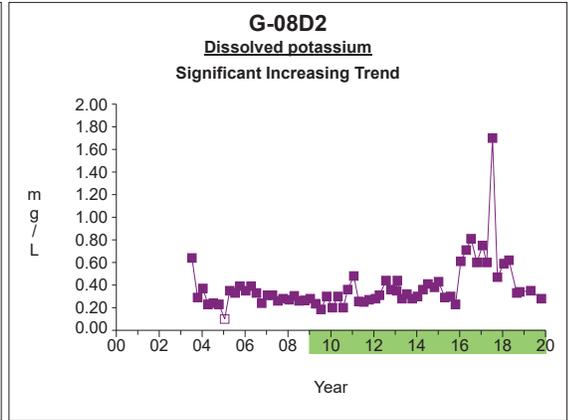
- Detect
- ND
- Outlier
- Trend test
- MCL Limit
- Samples



Graph 104

Time Series

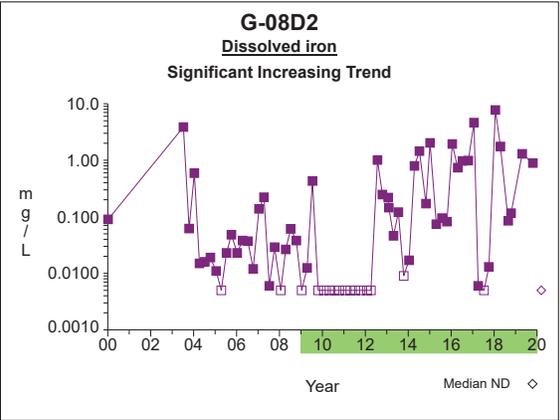
- Detect
- ND
- Outlier
- Trend test
- MCL Limit
- Samples



Graph 120

Time Series

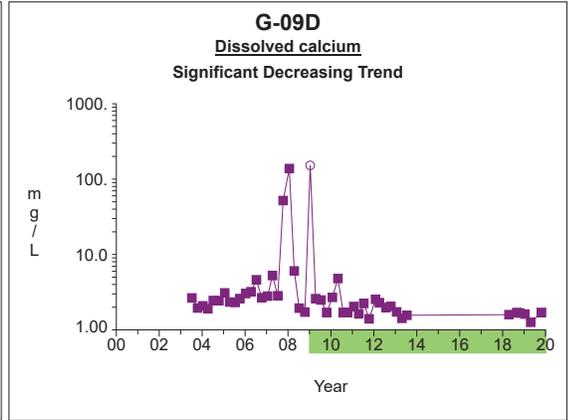
- Detect
- ND
- Outlier
- Trend test
- MCL Limit
- Samples



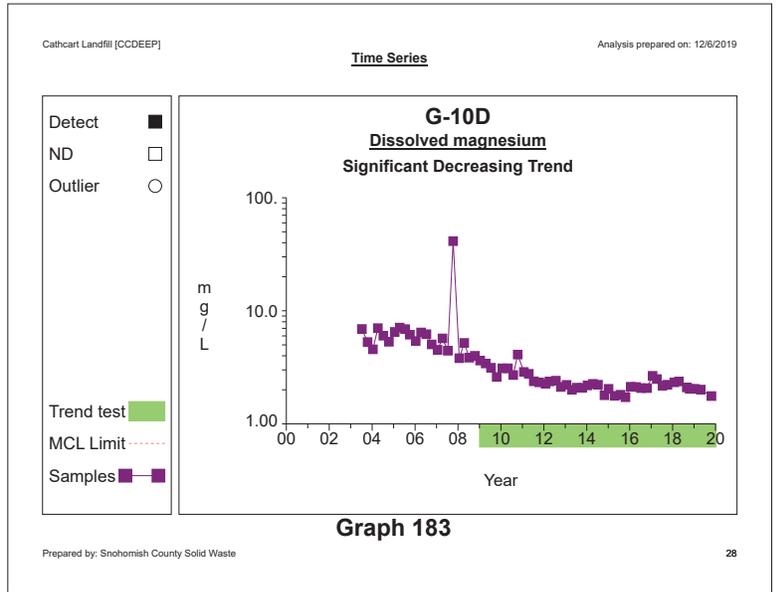
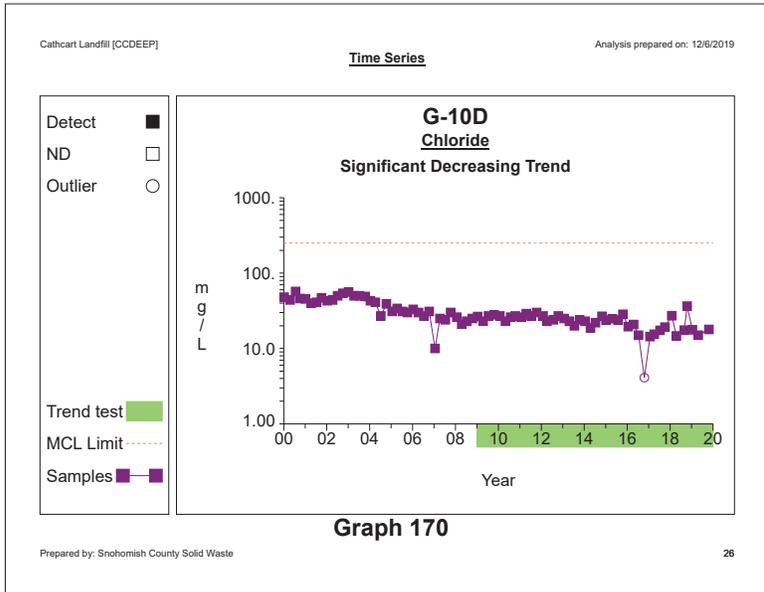
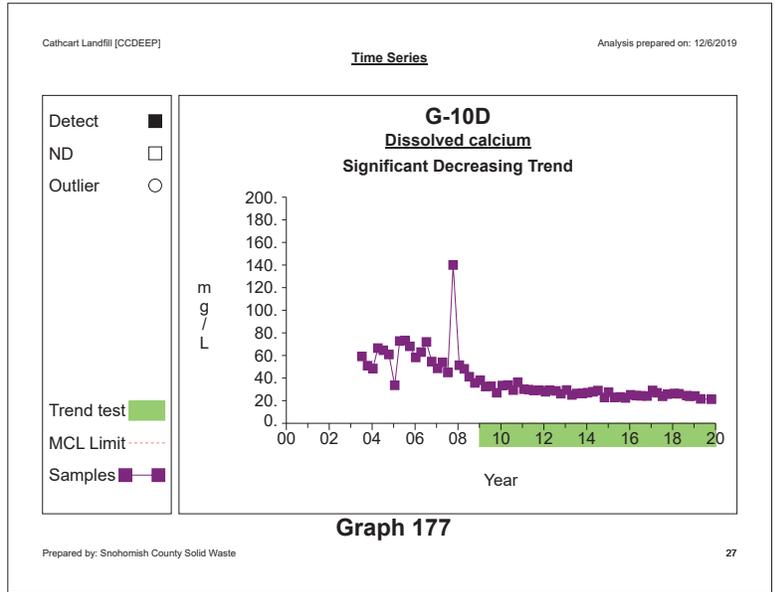
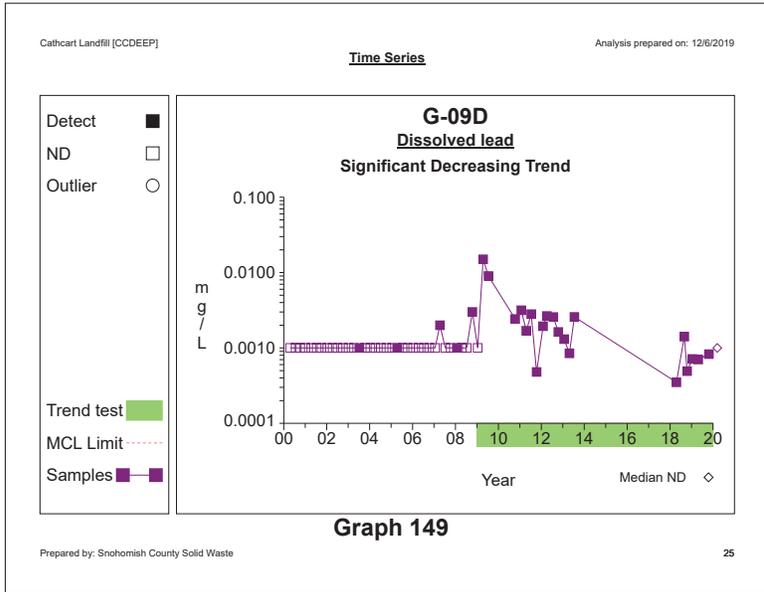
Graph 115

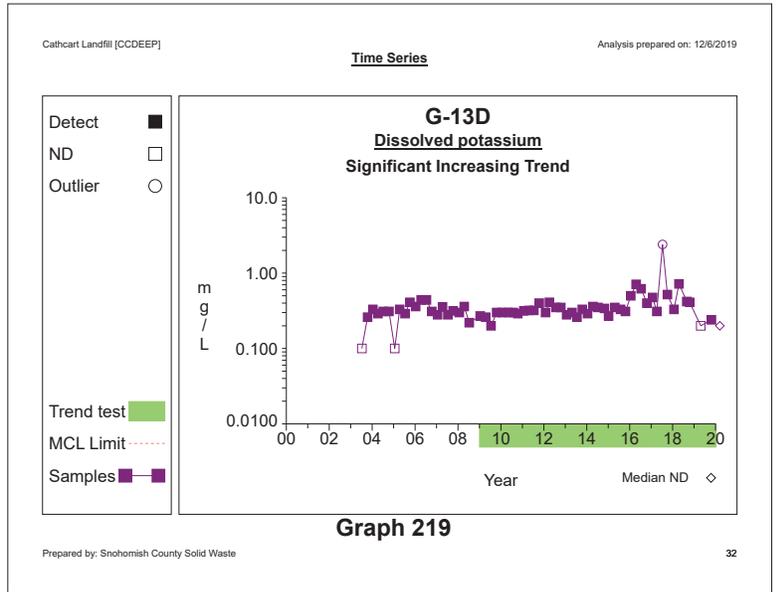
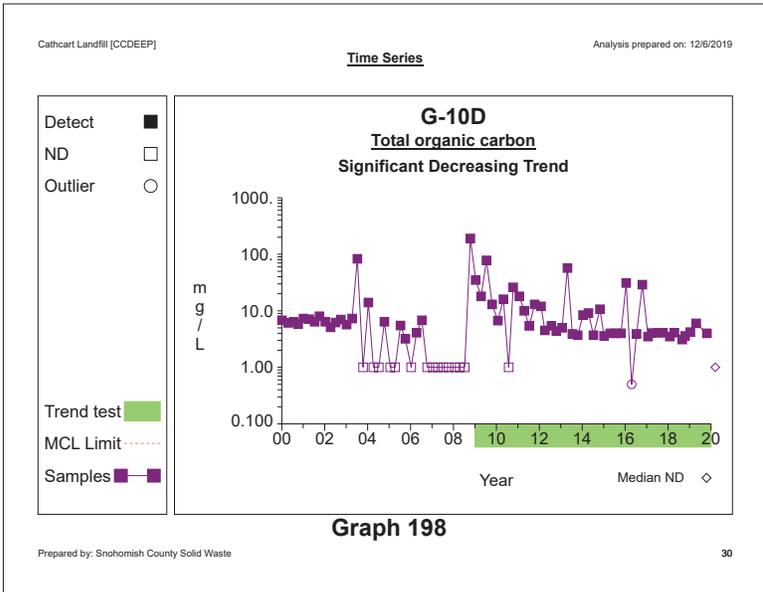
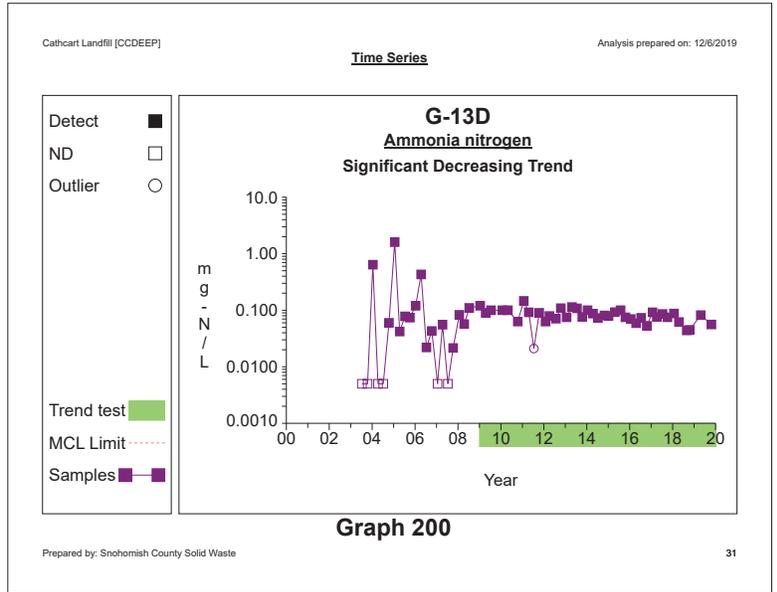
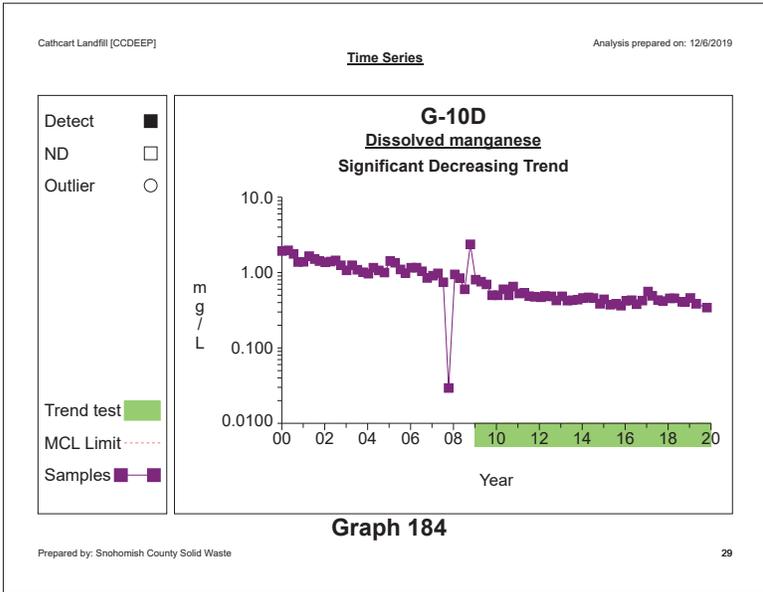
Time Series

- Detect
- ND
- Outlier
- Trend test
- MCL Limit
- Samples

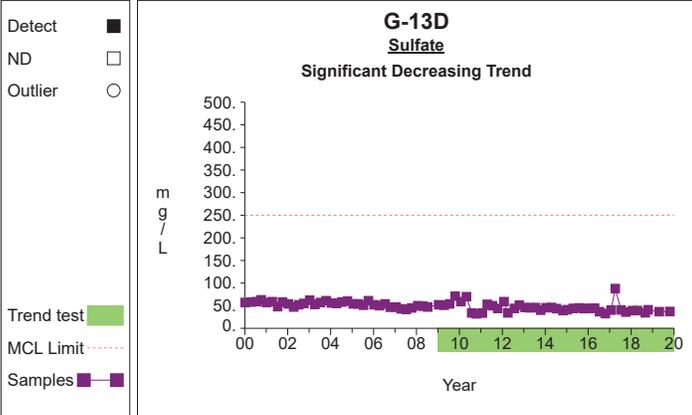


Graph 144



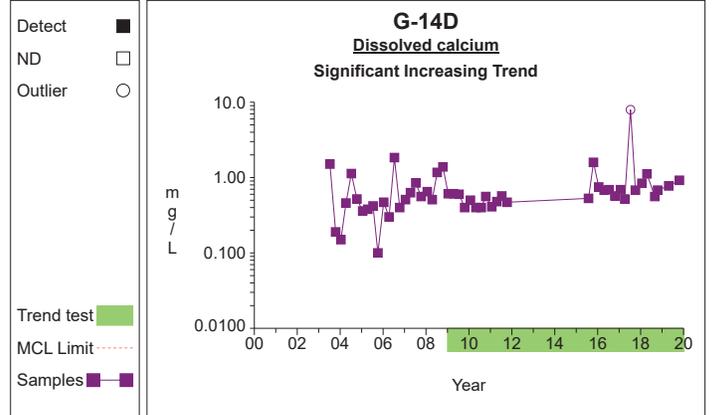


Time Series



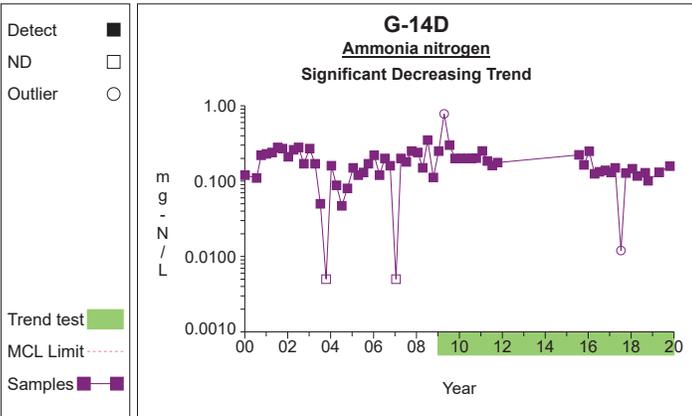
Graph 229

Time Series



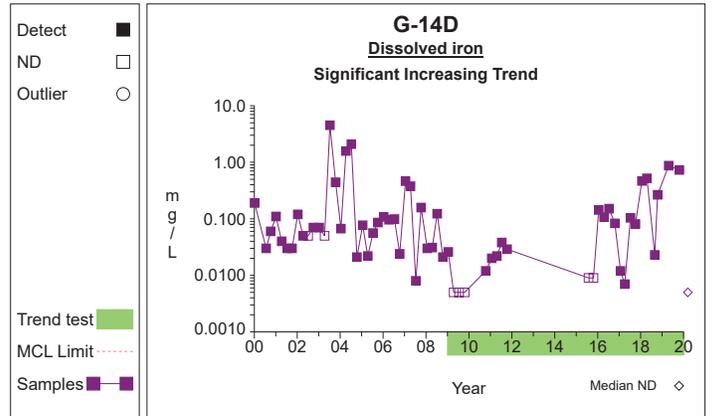
Graph 243

Time Series



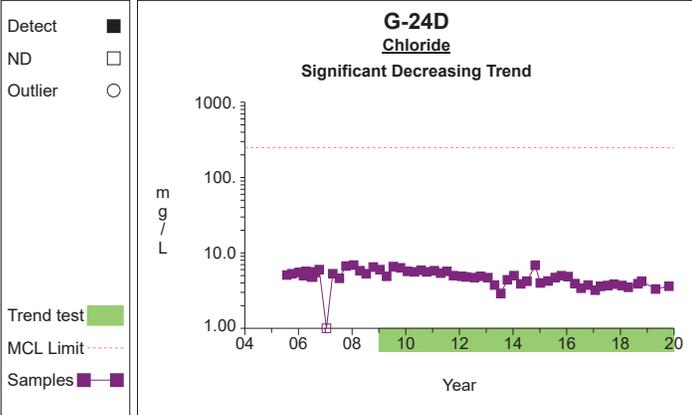
Graph 233

Time Series



Graph 247

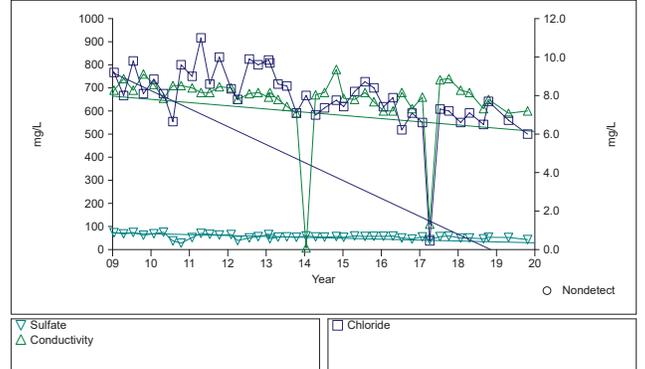
Time Series



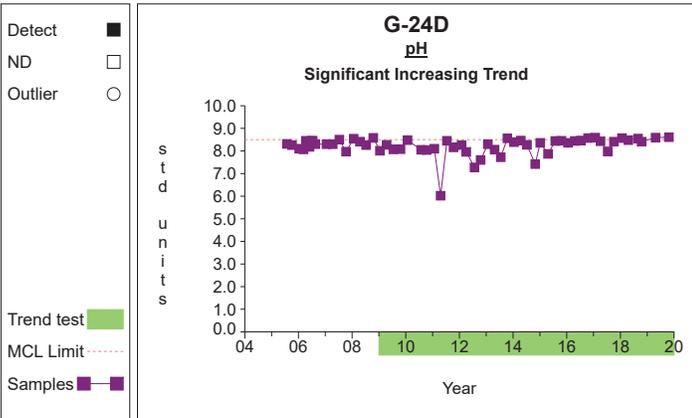
Graph 269

Cathcart Landfill

Time Series Plot for G-01D



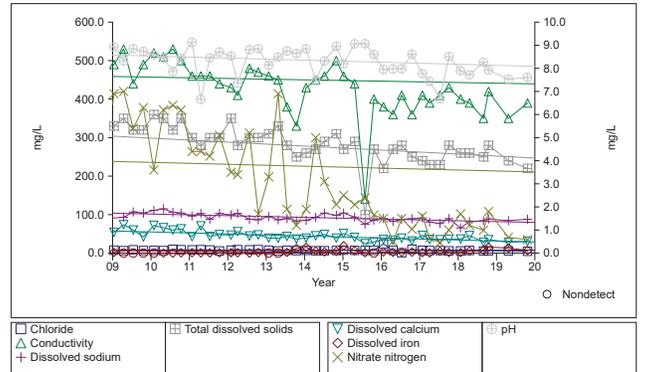
Time Series



Graph 294

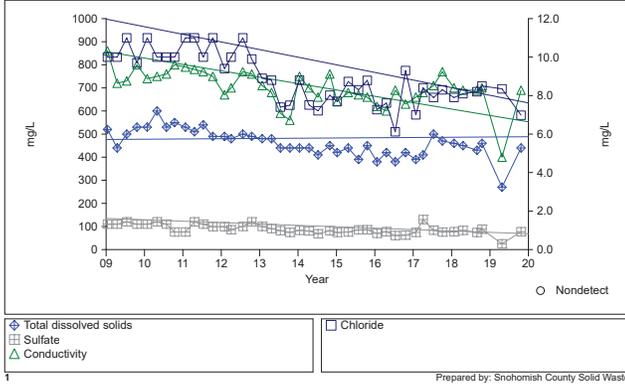
Cathcart Landfill

Time Series Plot for G-02D



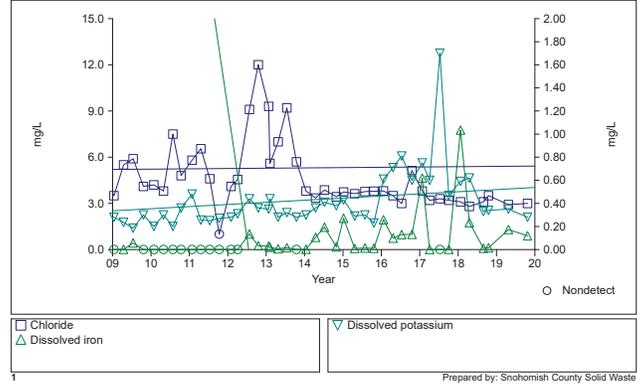
Cathcart Landfill

Time Series Plot for G-06B



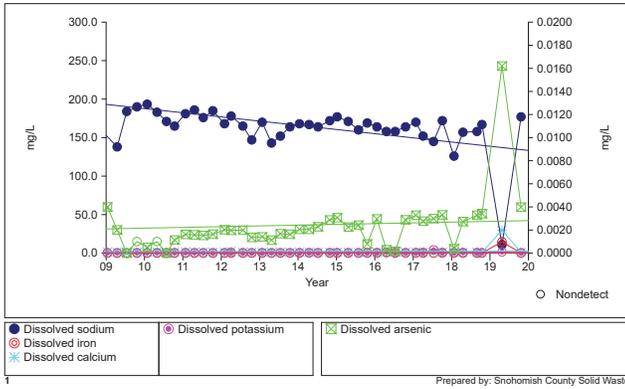
Cathcart Landfill

Time Series Plot for G-08D2



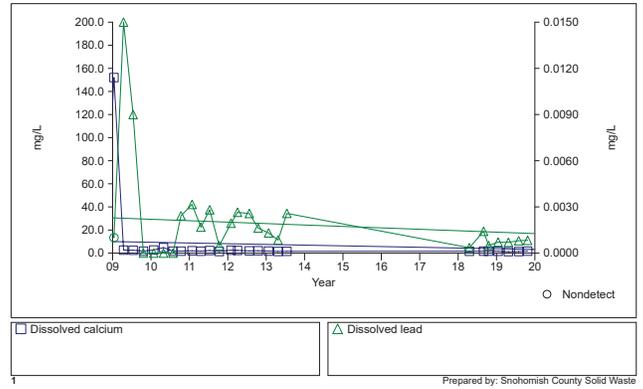
Cathcart Landfill

Time Series Plot for G-06B



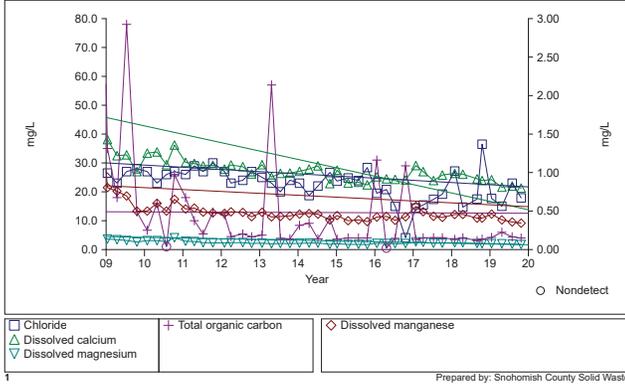
Cathcart Landfill

Time Series Plot for G-09D



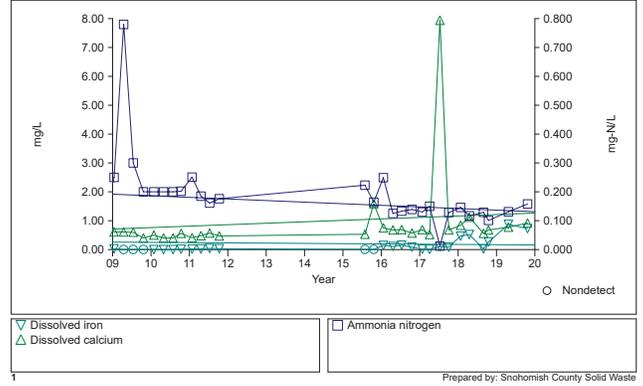
Cathcart Landfill

Time Series Plot for G-10D



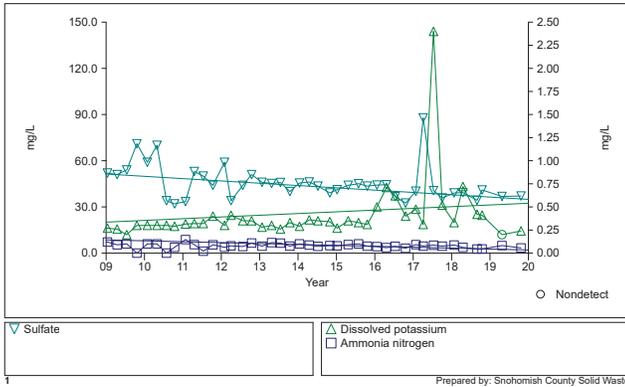
Cathcart Landfill

Time Series Plot for G-14D



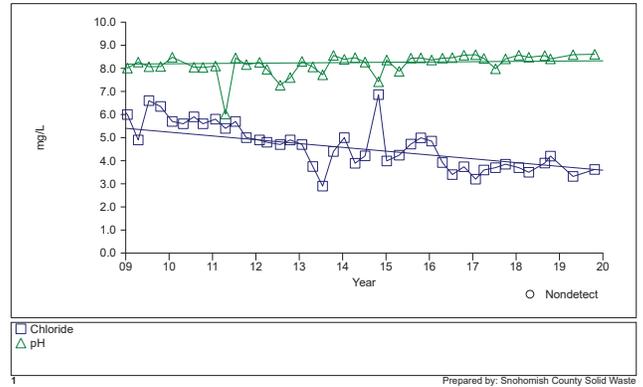
Cathcart Landfill

Time Series Plot for G-13D



Cathcart Landfill

Time Series Plot for G-24D



Appendix D

Field Monitoring Forms

**LEACHATE PRETREATMENT FACILITY
CLARIFIER LEVEL
MONTHLY INSPECTION:**

DATE: 30-Jan-19		INSPECTOR: Matt Lawless / Manny Tarango				
LOCATION:	CONFINED SPACE (TYPE)	FLUID DEPTH (INCHES)	CONDITION:		SUMP PUMP WORKING?	COMMENTS:
			ODORS	DEFECTS		
FD-1	FIRE DEPARTMENT					UNABLE TO LOCATE
P-BV-1	BLOWER VAULT	0"	NO	NONE	-----	
P-FV-2	FLOW METER VAULT	0"	NO	NONE	-----	
P-MH-3	MAN HOLE	0"	NO	NONE	YES	
P-MH-4	MAN HOLE	0"	NO	NONE	YES	
P-MH-5	MAN HOLE					Sludge Storage - Leak Detection
P-MH-6	MAN HOLE					Clarifier - Leak Detection
P-MH-7	MAN HOLE					Clarifier - Leak Detection
P-MH-8	MAN HOLE					Overflow to SP 7
P-MH-9	MAN HOLE	~12"	NO	NONE	-----	
P-VV-10	VALVE VAULT	0"	NO	NONE	-----	
P-VV-11	VALVE VAULT	0"	NO	NONE	-----	
P-VV-12	VALVE VAULT	0"	NO	NONE	-----	
P-VV-9	VALVE VAULT	12"	NO	YES	-----	Pumped out with trash pump on 1-30-19
SP-7	SUMP PUMP	~12"	NO	NONE	YES	
SP-8	SUMP PUMP	~12"	NO	NONE	YES	

COMMENTS:

Faucet PVV-10 is leaking and there is a drip out of the valve in P-VV-9.

**LEACHATE PRETREATMENT FACILITY
CLARIFIER LEVEL
MONTHLY INSPECTION:**

DATE: 28-Feb-19		INSPECTOR(S): Matt Lawless / Trina Arnold					
LOCATION:	CONFINED SPACE (TYPE)	FLUID DEPTH (INCHES)	CONDITION:		SUMP PUMP?	SUMP PUMP WORKING?	COMMENTS:
			ODORS	DEFECTS			
FD-1	FIRE DEPARTMENT						UNABLE TO LOCATE
P-BV-1	BLOWER VAULT	0"	NO	NONE		-----	
P-FV-2	FLOW METER VAULT	0"	NO	NONE		-----	
P-MH-3	MAN HOLE	0"	NO	NONE	YES	YES	
P-MH-4	MAN HOLE	0"	NO	NONE	YES	YES	
P-MH-5	MAN HOLE						Sludge Storage - Leak Detection
P-MH-6	MAN HOLE						Clarifier - Leak Detection
P-MH-7	MAN HOLE						Clarifier - Leak Detection
P-MH-8	MAN HOLE						Overflow to SP 7
P-MH-9	MAN HOLE	~12"	NO	NONE		-----	
P-VV-10	VALVE VAULT	0"	NO	NONE		-----	
P-VV-11	VALVE VAULT	0"	NO	NONE		-----	
P-VV-12	VALVE VAULT	0"	NO	NONE		-----	
P-VV-9	VALVE VAULT	12"	NO	YES		-----	Pumped out with trash pump on 1-30-19
SP-7	SUMP PUMP	~12"	NO	NONE	YES	YES	
SP-8	SUMP PUMP	~12"	NO	NONE	YES	YES	
COMMENTS:							

**LEACHATE PRETREATMENT FACILITY
CLARIFIER LEVEL
MONTHLY INSPECTION:**

DATE: 21-Mar-19

INSPECTOR(S): Manny Tarango

LOCATION:	CONFINED SPACE (TYPE)	FLUID DEPTH (INCHES)	CONDITION:		SUMP PUMP?	SUMP PUMP WORKING?	COMMENTS
			ODORS	DEFECTS			
FD-1	FIRE DEPARTMENT						UNABLE TO LOCATE
P-BV-1	BLOWER VAULT	0"	NO	NONE		---	
P-FV-2	FLOW METER VAULT	0"	NO	NONE		---	
P-MH-3	MAN HOLE	0"	NO	NONE	YES	YES	
P-MH-4	MAN HOLE	0"	NO	NONE	YES	YES	
P-MH-5	MAN HOLE						Sludge Storage - Leak Detection
P-MH-6	MAN HOLE						Clarifier - Leak Detection
P-MH-7	MAN HOLE						Clarifier - Leak Detection
P-MH-8	MAN HOLE						Overflow to SP 7
P-MH-9	MAN HOLE	~12"	NO	NONE		---	
P-VV-10	VALVE VAULT	0"	NO	NONE		---	
P-VV-11	VALVE VAULT	0"	NO	NONE		---	
P-VV-12	VALVE VAULT	0"	NO	NONE		---	
P-VV-9	VALVE VAULT	12"	NO	YES		---	Pumped out with trash pump on 1-30-19
SP-7	SUMP PUMP	~12"	NO	NONE	YES	YES	
SP-8	SUMP PUMP	~12"	NO	NONE	YES	YES	

COMMENTS:

**LEACHATE PRETREATMENT FACILITY
CLARIFIER LEVEL
MONTHLY INSPECTION:**

DATE: 30-Apr-19		INSPECTOR(S):			ML & TA		COMMENTS:
LOCATION:	CONFINED SPACE (TYPE)	FLUID DEPTH (INCHES)	CONDITION:		SUMP PUMP?	SUMP PUMP WORKING?	
			ODORS	DEFECTS			
FD-1	FIRE DEPARTMENT						UNABLE TO LOCATE
P-BV-1	BLOWER VAULT	0"	NO	NONE		-----	
P-FV-2	FLOW METER VAULT	0"	NO	NONE		-----	
P-MH-3	MAN HOLE	0"	NO	NONE	YES	YES	
P-MH-4	MAN HOLE	0"	NO	NONE	YES	YES	
P-MH-5	MAN HOLE						Sludge Storage - Leak Detection
P-MH-6	MAN HOLE						Clarifier - Leak Detection
P-MH-7	MAN HOLE						Clarifier - Leak Detection
P-MH-8	MAN HOLE						Overflow to SP 7
P-MH-9	MAN HOLE	~12"	NO	NONE		-----	
P-VV-10	VALVE VAULT	0"	NO	NONE		-----	
P-VV-11	VALVE VAULT	0"	NO	NONE		-----	
P-VV-12	VALVE VAULT	0"	NO	NONE		-----	
P-VV-9	VALVE VAULT	12"	NO	YES		-----	
SP-7	SUMP PUMP	~12"	NO	NONE	YES	YES	
SP-8	SUMP PUMP	~12"	NO	NONE	YES	YES	
COMMENTS:							

**LEACHATE PRETREATMENT FACILITY
CLARIFIER LEVEL
MONTHLY INSPECTION:**

DATE: 29-May-19		INSPECTOR(S): TA					
LOCATION:	CONFINED SPACE (TYPE)	FLUID DEPTH (INCHES)	CONDITION:		SUMP PUMP?	SUMP PUMP WORKING?	COMMENTS:
			ODORS	DEFECTS			
FD-1	FIRE DEPARTMENT						UNABLE TO LOCATE
P-BV-1	BLOWER VAULT	0"	NO	NONE		-----	
P-FV-2	FLOW METER VAULT	0"	NO	NONE		-----	
P-MH-3	MAN HOLE	0"	NO	NONE	YES	YES	
P-MH-4	MAN HOLE	0"	NO	NONE	YES	YES	
P-MH-5	MAN HOLE						Sludge Storage - Leak Detection
P-MH-6	MAN HOLE						Clarifier - Leak Detection
P-MH-7	MAN HOLE						Clarifier - Leak Detection
P-MH-8	MAN HOLE						Overflow to SP 7
P-MH-9	MAN HOLE	~12"	NO	NONE		-----	
P-VV-10	VALVE VAULT	0"	NO	NONE		-----	
P-VV-11	VALVE VAULT	0"	NO	NONE		-----	
P-VV-12	VALVE VAULT	0"	NO	NONE		-----	
P-VV-9	VALVE VAULT	12"	NO	YES		-----	
SP-7	SUMP PUMP	~12"	NO	NONE	YES	YES	
SP-8	SUMP PUMP	~12"	NO	NONE	YES	YES	

COMMENTS:

**LEACHATE PRETREATMENT FACILITY
CLARIFIER LEVEL
MONTHLY INSPECTION:**

DATE: 25-Jun-19		INSPECTOR(S): ML-TA					COMMENTS:
LOCATION:	CONFINED SPACE (TYPE)	FLUID DEPTH (INCHES)	CONDITION:		SUMP PUMP?	SUMP PUMP WORKING?	COMMENTS:
			ODORS	DEFECTS			
FD-1	FIRE DEPARTMENT	—	—	—	—	—	UNABLE TO LOCATE
P-BV-1	BLOWER VAULT	0"	NO	NONE	—	-----	
P-FV-2	FLOW METER VAULT	0"	NO	NONE	—	-----	
P-MH-3	MAN HOLE	0"	NO	NONE	YES	YES	
P-MH-4	MAN HOLE	0"	NO	NONE	YES	YES	
P-MH-5	MAN HOLE	—	—	—	—	—	Sludge Storage - Leak Detection
P-MH-6	MAN HOLE	—	—	—	—	—	Clarifier - Leak Detection
P-MH-7	MAN HOLE	—	—	—	—	—	Clarifier - Leak Detection
P-MH-8	MAN HOLE	—	—	—	—	—	Overflow to SP 7
P-MH-9	MAN HOLE	~12"	NO	NONE	—	-----	
P-VV-10	VALVE VAULT	0"	NO	NONE	—	-----	
P-VV-11	VALVE VAULT	0"	NO	NONE	—	-----	
P-VV-12	VALVE VAULT	0"	NO	NONE	—	-----	
P-VV-9	VALVE VAULT	30"	NO	YES	—	-----	Keep an eye on it.
SP-7	SUMP PUMP	~12"	NO	NONE	YES	YES	
SP-8	SUMP PUMP	~12"	NO	NONE	YES	YES	
COMMENTS:							

**LEACHATE PRETREATMENT FACILITY
CLARIFIER LEVEL
MONTHLY INSPECTION:**

DATE: July 31, 2019		INSPECTOR(S):		ML-TA		COMMENTS:	
LOCATION:	CONFINED SPACE (TYPE)	FLUID DEPTH (INCHES)	CONDITION:		SUMP PUMP?	SUMP PUMP WORKING?	
			ODORS	DEFECTS			
FD-1	FIRE DEPARTMENT	—	—	—	—	—	UNABLE TO LOCATE
P-BV-1	BLOWER VAULT	0"	NO	NONE	—	-----	
P-FV-2	FLOW METER VAULT	0"	NO	NONE	—	-----	
P-MH-3	MAN HOLE	0"	NO	NONE	YES	YES	Clean out sediment
P-MH-4	MAN HOLE	0"	NO	NONE	YES	YES	Clean out sediment
P-MH-5	MAN HOLE	—	—	—	—	—	Sludge Storage - Leak Detection
P-MH-6	MAN HOLE	—	—	—	—	—	Clarifier - Leak Detection
P-MH-7	MAN HOLE	—	—	—	—	—	Clarifier - Leak Detection
P-MH-8	MAN HOLE	—	—	—	—	—	Overflow to SP 7
P-MH-9	MAN HOLE	~12"	NO	NONE	—	-----	Vactor
P-VV-10	VALVE VAULT	0"	NO	NONE	—	-----	
P-VV-11	VALVE VAULT	0"	NO	NONE	—	-----	
P-VV-12	VALVE VAULT	0"	NO	NONE	—	-----	
P-VV-9	VALVE VAULT	36"	NO	YES	—	-----	Vactor
SP-7	SUMP PUMP	~12"	NO	NONE	YES	YES	
SP-8	SUMP PUMP	~12"	NO	NONE	YES	YES	

COMMENTS:

**LEACHATE PRETREATMENT FACILITY
CLARIFIER LEVEL
MONTHLY INSPECTION:**

DATE: August 28, 2019		INSPECTOR(S): ML-TA					COMMENTS:
LOCATION:	CONFINED SPACE (TYPE)	FLUID DEPTH (INCHES)	CONDITION:		SUMP PUMP?	SUMP PUMP WORKING?	COMMENTS:
			ODORS	DEFECTS			
FD-1	FIRE DEPARTMENT	—	—	—	—	—	UNABLE TO LOCATE
P-BV-1	BLOWER VAULT	0"	NO	NONE	—	—	
P-FV-2	FLOW METER VAULT	0"	NO	NONE	—	—	
P-MH-3	MAN HOLE	0"	NO	NONE	YES	YES	
P-MH-4	MAN HOLE	0"	NO	NONE	YES	YES	
P-MH-5	MAN HOLE	—	—	—	—	—	Sludge Storage - Leak Detection
P-MH-6	MAN HOLE	—	—	—	—	—	Clarifier - Leak Detection
P-MH-7	MAN HOLE	—	—	—	—	—	Clarifier - Leak Detection
P-MH-8	MAN HOLE	0-1 Sediment	NO	NONE	—	—	Overflow to SP 7- (Inspect twice a year Aug & March)
P-MH-9	MAN HOLE	~12"	NO	NONE	—	—	Vactor
P-VV-10	VALVE VAULT	0"	NO	NONE	—	—	
P-VV-11	VALVE VAULT	0"	NO	NONE	—	—	
P-VV-12	VALVE VAULT	0"	NO	NONE	—	—	
P-VV-9	VALVE VAULT	36"	NO	YES	—	—	Vactor
SP-7	SUMP PUMP	~12"	NO	NONE	YES	YES	
SP-8	SUMP PUMP	~12"	NO	NONE	YES	YES	
COMMENTS:							

**LEACHATE PRETREATMENT FACILITY
CLARIFIER LEVEL
MONTHLY INSPECTION:**

DATE: September 30, 2019		INSPECTOR(S):		ML-TA			
LOCATION:	CONFINED SPACE (TYPE)	FLUID DEPTH (INCHES)	CONDITION:		SUMP PUMP?	SUMP PUMP WORKING?	COMMENTS:
			ODORS	DEFECTS			
FD-1	FIRE DEPARTMENT	—	—	—	—	—	UNABLE TO LOCATE
P-BV-1	BLOWER VAULT	0"	NO	NONE	—	-----	
P-FV-2	FLOW METER VAULT	0"	NO	NONE	—	-----	
P-MH-3	MAN HOLE	0"	NO	NONE	YES	YES	
P-MH-4	MAN HOLE	0"	NO	NONE	YES	YES	
P-MH-5	MAN HOLE	—	—	—	—	—	Sludge Storage - Leak Detection
P-MH-6	MAN HOLE	—	—	—	—	—	Clarifier - Leak Detection
P-MH-7	MAN HOLE	—	—	—	—	—	Clarifier - Leak Detection
P-MH-8	MAN HOLE	0-1 Sediment	NO	NONE	—	—	Overflow to SP 7- (Inspect twice a year Aug & March)
P-MH-9	MAN HOLE	~12"	NO	NONE	—	-----	
P-VV-10	VALVE VAULT	0"	NO	NONE	—	-----	
P-VV-11	VALVE VAULT	0"	NO	NONE	—	-----	
P-VV-12	VALVE VAULT	0"	NO	NONE	—	-----	
P-VV-9	VALVE VAULT	36"	NO	YES	—	-----	Leaky Gasket
SP-7	SUMP PUMP	~12"	NO	NONE	YES	YES	
SP-8	SUMP PUMP	~12"	NO	NONE	YES	YES	
COMMENTS:							

**LEACHATE PRETREATMENT FACILITY
CLARIFIER LEVEL
MONTHLY INSPECTION:**

DATE: October 29, 2019		INSPECTOR(S): ML-TA					COMMENTS:
LOCATION:	CONFINED SPACE (TYPE)	FLUID DEPTH (INCHES)	CONDITION:		SUMP PUMP?	SUMP PUMP WORKING?	
			ODORS	DEFECTS			
FD-1	FIRE DEPARTMENT	—	—	—	—	—	UNABLE TO LOCATE
P-BV-1	BLOWER VAULT	0"	NO	NONE	—	-----	
P-FV-2	FLOW METER VAULT	0"	NO	NONE	—	-----	
P-MH-3	MAN HOLE	0"	NO	NONE	YES	YES	
P-MH-4	MAN HOLE	0"	NO	NONE	YES	YES	
P-MH-5	MAN HOLE	—	—	—	—	—	Sludge Storage - Leak Detection
P-MH-6	MAN HOLE	—	—	—	—	—	Clarifier - Leak Detection
P-MH-7	MAN HOLE	—	—	—	—	—	Clarifier - Leak Detection
P-MH-8	MAN HOLE	0-1 Sediment	NO	NONE	—	—	Overflow to SP 7- (Inspect twice a year Aug & March)
P-MH-9	MAN HOLE	~12"	NO	NONE	—	-----	
P-VV-10	VALVE VAULT	0"	NO	NONE	—	-----	
P-VV-11	VALVE VAULT	0"	NO	NONE	—	-----	
P-VV-12	VALVE VAULT	0"	NO	NONE	—	-----	
P-VV-9	VALVE VAULT	4"	NO	YES	—	-----	Leaky Gasket
SP-7	SUMP PUMP	~12"	NO	NONE	YES	YES	
SP-8	SUMP PUMP	~12"	NO	NONE	YES	YES	
COMMENTS:							

**LEACHATE PRETREATMENT FACILITY
CLARIFIER LEVEL
MONTHLY INSPECTION:**

DATE: November 19, 2019

INSPECTOR(S):

ML-TA

LOCATION:	CONFINED SPACE (TYPE)	FLUID DEPTH (INCHES)	CONDITION:		SUMP PUMP?	SUMP PUMP WORKING?	COMMENTS:
			ODORS	DEFECTS			
FD-1	FIRE DEPARTMENT	—	—	—	—	—	UNABLE TO LOCATE
P-BV-1	BLOWER VAULT	0"	NO	NONE	—	-----	
P-FV-2	FLOW METER VAULT	0"	NO	NONE	—	-----	
P-MH-3	MAN HOLE	0"	NO	NONE	YES	YES	
P-MH-4	MAN HOLE	0"	NO	NONE	YES	YES	
P-MH-5	MAN HOLE	—	—	—	—	—	Sludge Storage - Leak Detection
P-MH-6	MAN HOLE	—	—	—	—	—	Clarifier - Leak Detection
P-MH-7	MAN HOLE	—	—	—	—	—	Clarifier - Leak Detection
P-MH-8	MAN HOLE	0-1 Sediment	NO	NONE	—	—	Overflow to SP 7- (Inspect twice a year Aug & March)
P-MH-9	MAN HOLE	~12"	NO	NONE	—	-----	
P-VV-10	VALVE VAULT	0"	NO	NONE	—	-----	
P-VV-11	VALVE VAULT	0"	NO	NONE	—	-----	
P-VV-12	VALVE VAULT	0"	NO	NONE	—	-----	
P-VV-9	VALVE VAULT	8"	NO	YES	—	-----	Leaky Gasket
SP-7	SUMP PUMP	~12"	NO	NONE	YES	YES	
SP-8	SUMP PUMP	~12"	NO	NONE	YES	YES	

COMMENTS:

**LEACHATE PRETREATMENT FACILITY
CLARIFIER LEVEL
MONTHLY INSPECTION:**

DATE: December 20, 2019		INSPECTOR(S): ML					
LOCATION:	CONFINED SPACE (TYPE)	FLUID DEPTH (INCHES)	CONDITION:		SUMP PUMP?	SUMP PUMP WORKING?	COMMENTS:
			ODORS	DEFECTS			
FD-1	FIRE DEPARTMENT	—	—	—	—	—	UNABLE TO LOCATE
P-BV-1	BLOWER VAULT	0"	NO	NONE	—	—	
P-FV-2	FLOW METER VAULT	0"	NO	NONE	—	—	
P-MH-3	MAN HOLE	0"	NO	NONE	YES	YES	
P-MH-4	MAN HOLE	0"	NO	NONE	YES	YES	
P-MH-5	MAN HOLE	—	—	—	—	—	Sludge Storage - Leak Detection
P-MH-6	MAN HOLE	—	—	—	—	—	Clarifier - Leak Detection
P-MH-7	MAN HOLE	—	—	—	—	—	Clarifier - Leak Detection
P-MH-8	MAN HOLE	0-1 Sediment	NO	NONE	—	—	Overflow to SP 7- (Inspect twice a year Aug & March)
P-MH-9	MAN HOLE	~12"	NO	NONE	—	—	
P-VV-10	VALVE VAULT	0"	NO	NONE	—	—	
P-VV-11	VALVE VAULT	0"	NO	NONE	—	—	
P-VV-12	VALVE VAULT	0"	NO	NONE	—	—	
P-VV-9	VALVE VAULT	12"	NO	YES	—	—	Leaky Gasket
SP-7	SUMP PUMP	~12"	NO	NONE	YES	YES	
SP-8	SUMP PUMP	~12"	NO	NONE	YES	YES	
COMMENTS:							

Site	Location: Probe	Time (Military)	Methane (% VOL)	Oxygen (% VOL, % LEL, PPM)	Carbon Diox. (% VOL)	Velocity	Pressure	Comments
CATHCART	GP-4	<i>1318</i>	<i>0</i>	<i>21</i>	<i>6</i>			
	GP-5(1)	<i>1326</i>	<i>0</i>	<i>21</i>	<i>0</i>			
	GP-5(2)	<i>1327</i>	<i>0</i>	<i>18</i>	<i>4</i>			
	GP-1(1)	<i>1336</i>	<i>0</i>	<i>21</i>	<i>0</i>			
	GP-1(2)	<i>1336</i>	<i>0</i>	<i>21</i>	<i>0</i>			
	GP-2(1)	<i>1339</i>	<i>0</i>	<i>13</i>	<i>7</i>			
	GP-2(2)	<i>1339</i>	<i>0</i>	<i>7</i>	<i>11</i>			
	GP-3	<i>1348</i>	<i>0</i>	<i>21</i>	<i>0</i>			
	Main Man	<i>1352</i>	<i>56</i>	<i>3</i>	<i>32</i>	<i>427</i>		
Site	Location: Barhole	Time (Military)	Methane (% VOL)	Oxygen (% VOL, % LEL, PPM)	Carbon Diox. (% VOL)	Velocity	Pressure	Comments
CATHCART	BH-3	<i>1323</i>	<i>0</i>	<i>21</i>	<i>0</i>			
	BH-4	<i>1325</i>	<i>0</i>	<i>20</i>	<i>2</i>			
	BH-5	<i>1329</i>	<i>0</i>	<i>21</i>	<i>0</i>			
	BH-6	<i>1333</i>	<i>0</i>	<i>20</i>	<i>2</i>			
	BH-7	<i>1335</i>	<i>0</i>	<i>21</i>	<i>1</i>			
	BH-8	<i>1331</i>	<i>0</i>	<i>21</i>	<i>1</i>			
Site	Location: Structure	Time (Military)	Methane (% VOL)	Oxygen (% VOL, % LEL, PPM)	Carbon Diox. (% VOL)	Velocity	Pressure	Comments
CATHCART	SP-4	<i>1340</i>	<i>0</i>	<i>21</i>	<i>0</i>			
	C-FV-1'	<i>1341</i>	<i>0</i>	<i>21</i>	<i>0</i>			
	C-COV-2	<i>1342</i>	<i>0</i>	<i>21</i>	<i>0</i>			
	C-VV-2	<i>1342</i>	<i>0</i>	<i>21</i>	<i>0</i>			
	SP-1	<i>1343</i>	<i>0</i>	<i>21</i>	<i>4</i>			
	C-VV-3	<i>1343</i>	<i>0</i>	<i>21</i>	<i>0</i>			
	Grit Chamber	<i>1344</i>	<i>0</i>	<i>21</i>	<i>2</i>			
	C-FV-2	<i>1344</i>	<i>0</i>	<i>21</i>	<i>0</i>			
	C-VV-5	<i>1345</i>	<i>0</i>	<i>21</i>	<i>0</i>			

Methane/Oxygen Meter Used =
 Barometer =
 Technician Name =
 Page =

<i>GEM 5000</i>
<i>29.70</i>
<i>Matt Lawless, Trina Nudd</i>
2 of 2